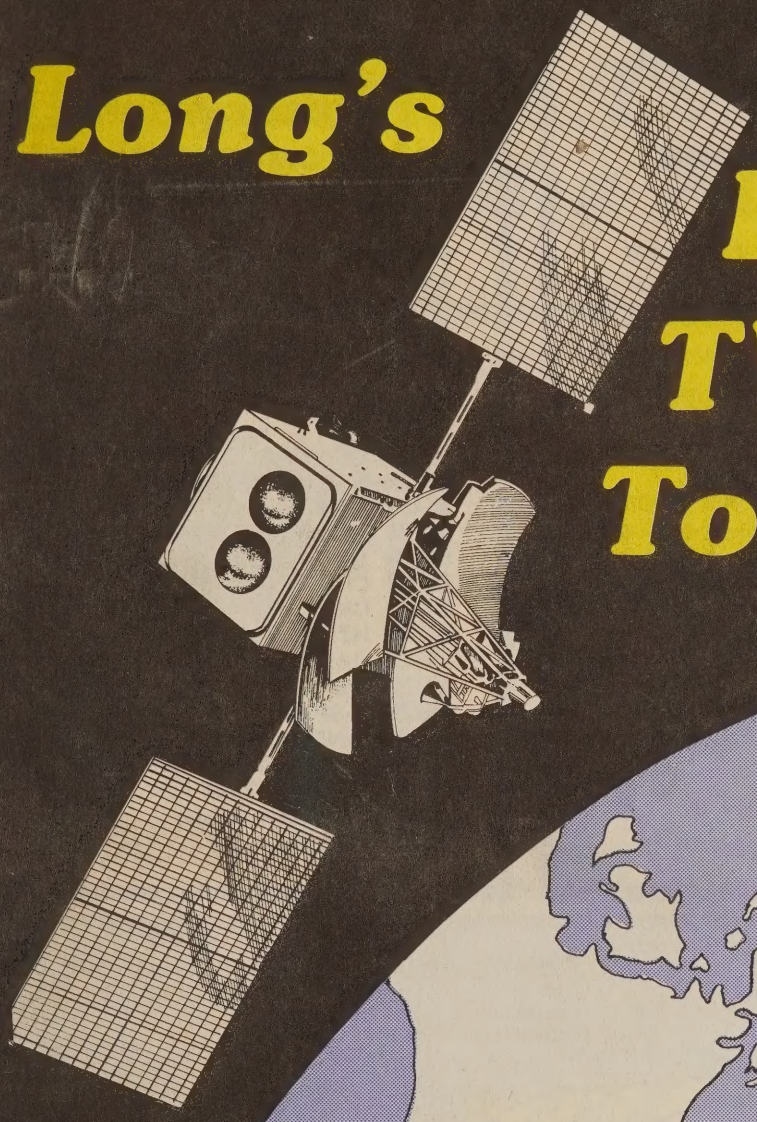
Long's Brings TV Down To Earth



NOTE! *Special thanks to Satellite TV magazine for letting us use several of their articles.*

Dealer Flyer-105

Long's Electronics

MAIL ORDERS: P.O.BOX 11347 BIRMINGHAM, AL 35202 • STREET ADDRESS: 2808 7TH AVENUE SOUTH, BIRMINGHAM, ALABAMA 35233

North American Domsat Existing 4 GHz Satellites & Locations

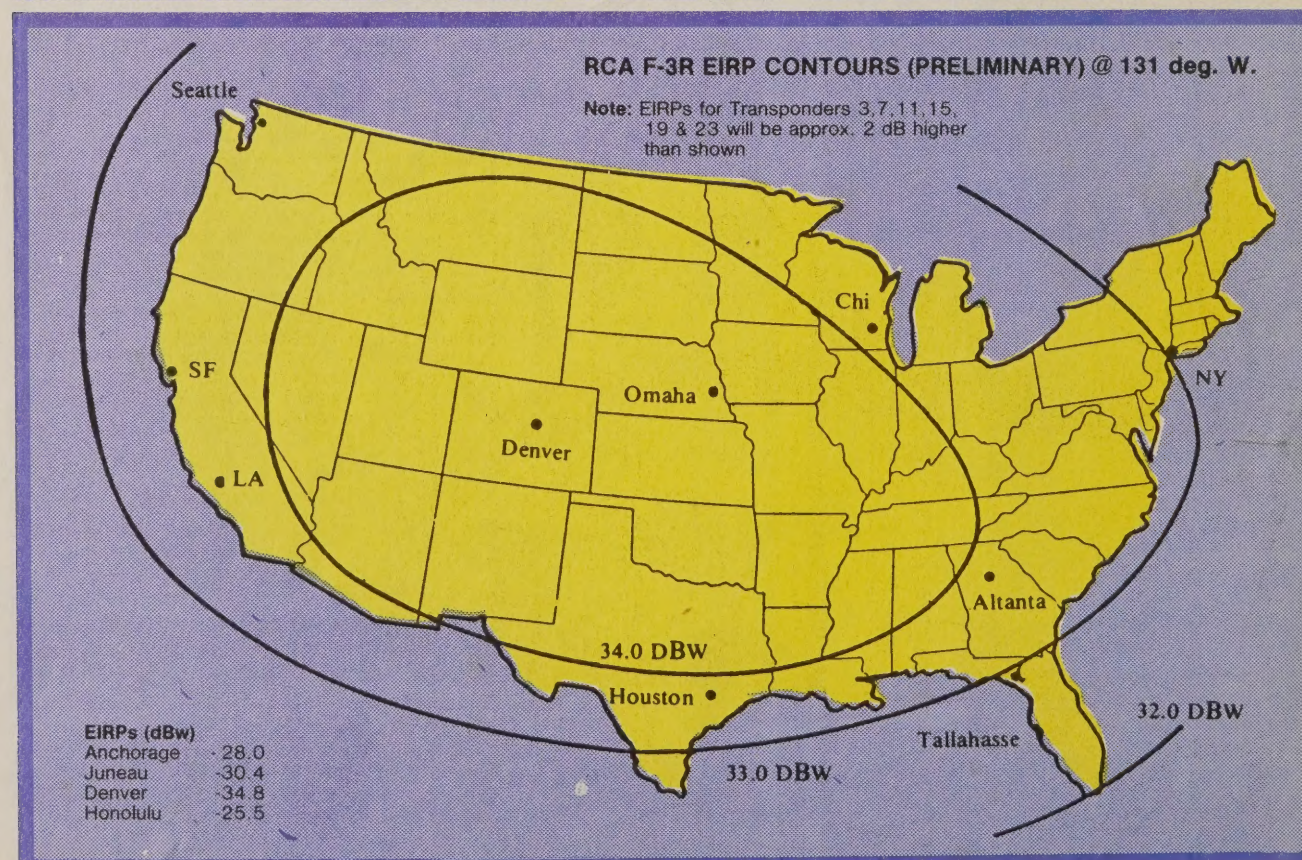
NAME	LOCATION	FORMAT	COMMENTS
Satcom	135 deg. W	24 ch V & H	occasional video feeds
Satcom IIIR	131	24 ch V & H	regular programing (24 ch)
Comstar D-4	127	24 ch V & H	occasional video feeds
Westar II	123.5	12 ch H	occasional video feeds
Satcom II	119	24 ch V & H	24 ch regular programing
Anik 2 & 3	114	12 ch H	regular programing (3-5 ch)
Anik B	109	12 ch H	regular programing (4-6 ch)
Westar I	99	12 ch H	regular programing (4-6 ch)
Comstar D1 & D2	95	24 ch V & H	regular programing (4-6 ch)
Westar III	91	12 ch H	regular programing (4-6 ch)
Comstar D3	87	24 ch V & H	occasional video feeds

FUTURE 4 GHz SATELLITE AND LOCATIONS

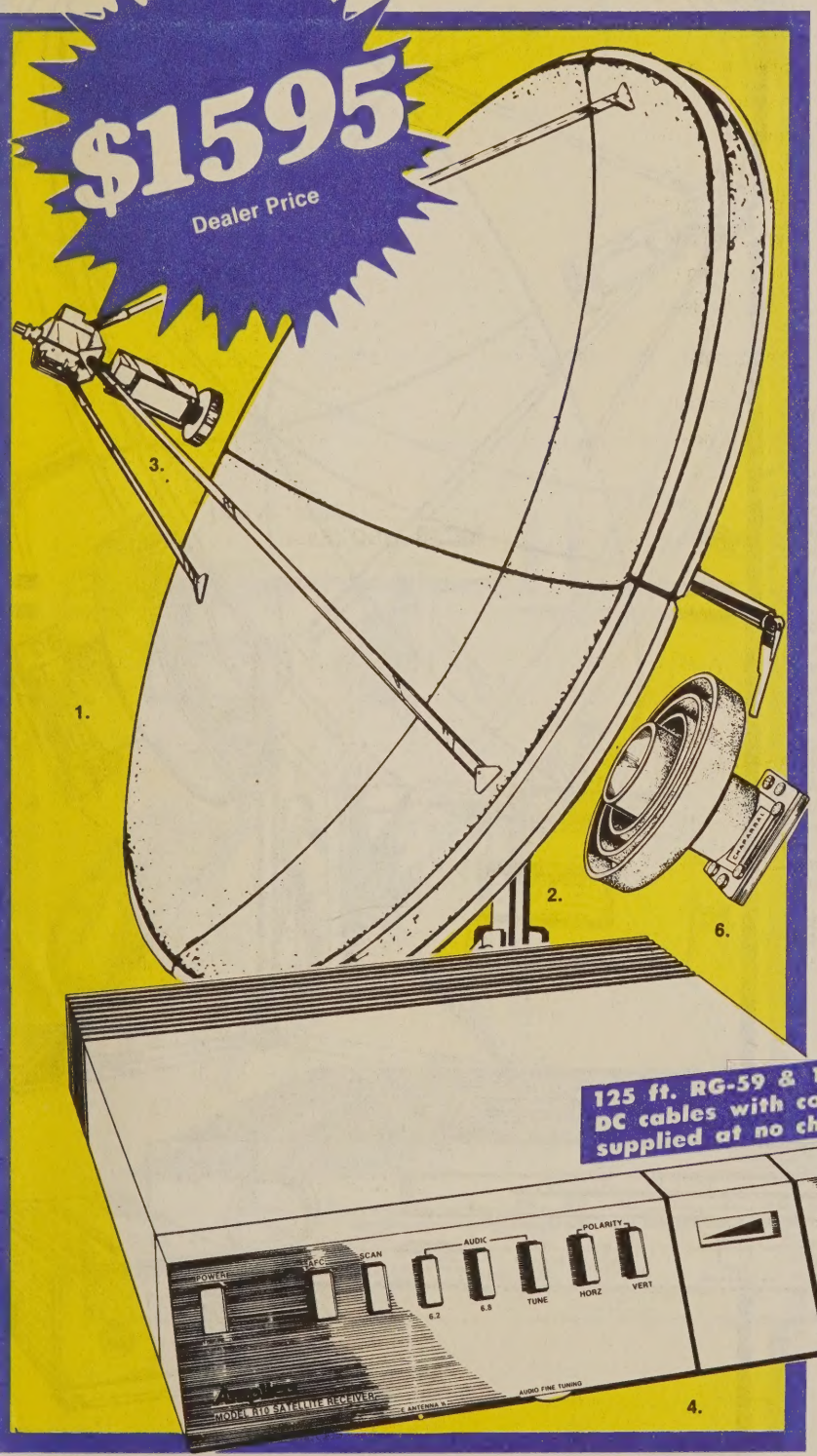
Satcom IV (Spr. '82) 83 deg. W	24 ch V & H	programing unknown
Satcom V (Fall '82) 143	24 ch. V & H	programing unknown
Westar IV (Sum. '82) 99	24 ch. V & H	network & cable TV
Anik D-1 (Sum. '82) 109	24 ch. V & H	Canadian pay TV
Westar IV (1983) 123	24 ch. V & H	unknown programing

Satcom F-3 Description of Programming - Video Services

1. NICKELODEON ARTS
2. PTL
3. WGN
4. SPOTLIGHT
5. THE MOVIE CHANNEL
6. WTBS
7. ESPN
8. CBN
9. USA CABLE NETWORK/BET
10. SHOWTIME (West)
11. MTV
12. SHOWTIME (East)
13. HBO (West)
14. CNN
15. CNN2
16. HTN PLUS/ASCN NJT
17. CABLE HEALTH NETWORK
18. EWTN/REUTERS
19. C-SPAN
20. CINEMAX (East)
21. THE WEATHER CHANNEL
22. MSN/DAYTIME HBO
23. CINEMAX (West)
24. HBO (East)



The "LNC" is here!
10' Satellite TV system featuring the Amplica RC-10 receiver



Item No. MISSY70
Shipped Freight Collect

10 FT. PARABOLIC

What the system will do:

You can receive up to 60 channels of TV direct from satellites to your home receiver. Movies, sporting events, religious programs, other TV stations and much more.

What the system includes:

1. 10 ft. dish made of reflective metal bonded with fiberglass. Weather-resistant and virtually maintenance-free. Comes in 4 sections.

2. Polar mount complete with azimuth and elevation adjustments for easy satellite-to-satellite tracking. Patented linkage to allow dish to travel from horizon to horizon.

3. Tripod LNC mount complete with rotor for adjusting LNC polarity. Tubing for mount legs not included.

4. Amplica R-10 satellite video receiver-an advancement in the art. Unlike some receivers that are stripped versions of commerical units, the R-10 is system engineered, designed from the ground up for private TVRO. This means you get many unmatched benefits such as: ● Decor-coordinated appearance and colors ● Signal strength meter for easy fine tuning ● Best picture quality anywhere ● Built-in accessory controls (polarization switch, antenna actuator).

5. Amplica Low Noise Converter- a signal "Superconditioner". Amplica mates its famous LNA with a custom downconverter, for amplification, frequency, conversion and channel selection in one rugged, weatherproof package. Look at the extra benefits this gives you: ● No separate downconverter to buy ● Optimum factory tuning of LNC and receiver ● Built-in, advanced lightning-suppression circuitry ● Serialized, QC-approved, data supplied ● Simple installation without special hardware or adaptors ● High gain allows up to 400' separation between antenna and receiver.

6. Chaparral feed horn: Provides 0.5 dB gain improvement over conventional rectangular horns. Virtually eliminates system noise. Add $48 for RF modulator.

Complete 8 foot Satellite TV System

CALL TOLL FREE
1-800-633-4984

$1395

DEALER PRICE
Item No. MISSY8
Shipped Motor Freight Collect

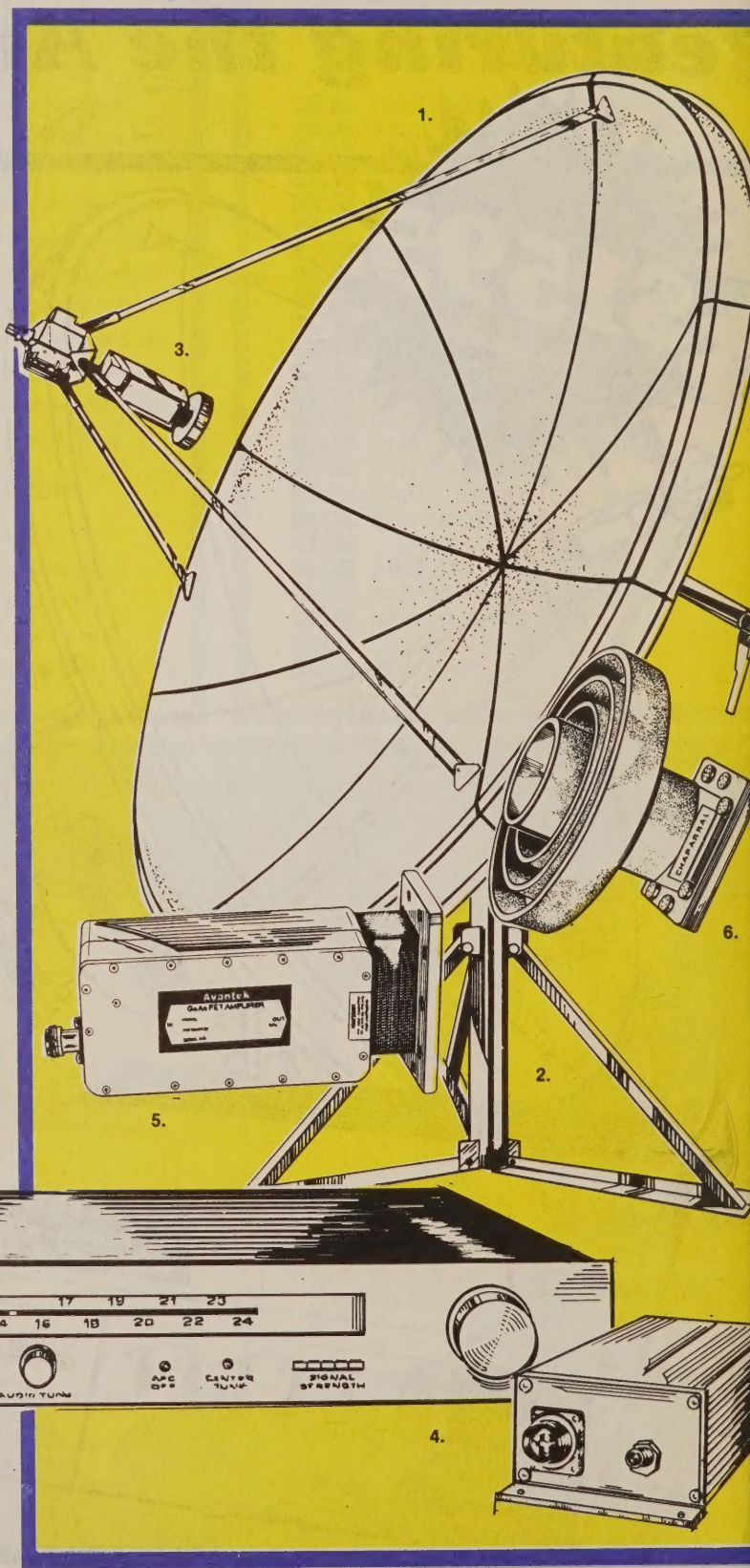
8 FOOT PARABOLIC

What the system will do:

Receives up to 60 channels of TV direct from satellites to your home receiver. Movies, sports and cultural events, religious programs, other TV stations and much more.

What the system includes:

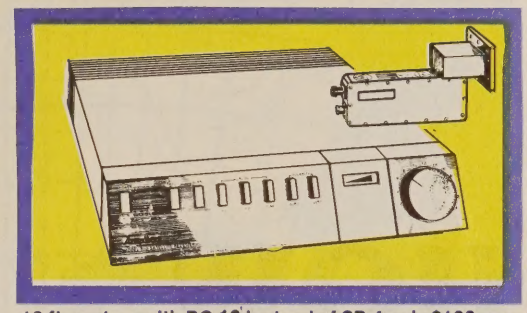
1. An 8 ft. fiberglass dish made of reflective metal bonded with fiberglass. Weather resistant and virtually maintenance-free. Comes in 8 sections for easy assembly.
2. Polar mount complete with azimuth and elevation adjustments for precise satellite-to-satellite tracking. Patented linkage allows dish to travel from horizon to horizon.
3. LNA mount complete with rotor for turning LNA from horizontal to vertical polarity. Extension poles not included.
4. KLM SR-4 satellite receiver. Consists of two parts, downconverter and receiver. Receiver features slide rule tuning, AFC defeat, video inversion and the latest in single -conversion electronics. RF modulator optional.
5. Avantek 4215 low noise amplifier. Consists of a 120° uncooled LNA. Takes the weak signals reflected from the dish and amplifies them prior to being sent to the downconverter. Uses GaAs FET transistors for maximum performance. Power supplied through coax line. Urethane coated.
6. Chaparral feed horn. Provides 0.5 dB gain improvement over conventional rectangular horns. Virtually eliminates system noise.
Note: Customer must provide all cables (approx. cost $80) VCR may be used as RF modulator, otherwise RF modulator required (approx. cost $48).



Complete 13 Foot Satellite TV System

$2095

Dealer Price
Shipped Motor Freight Collect
Item No. MISSY14



13 ft. system with RC-10 instead of SR-4 only $100 more.
Item No. MISSY73

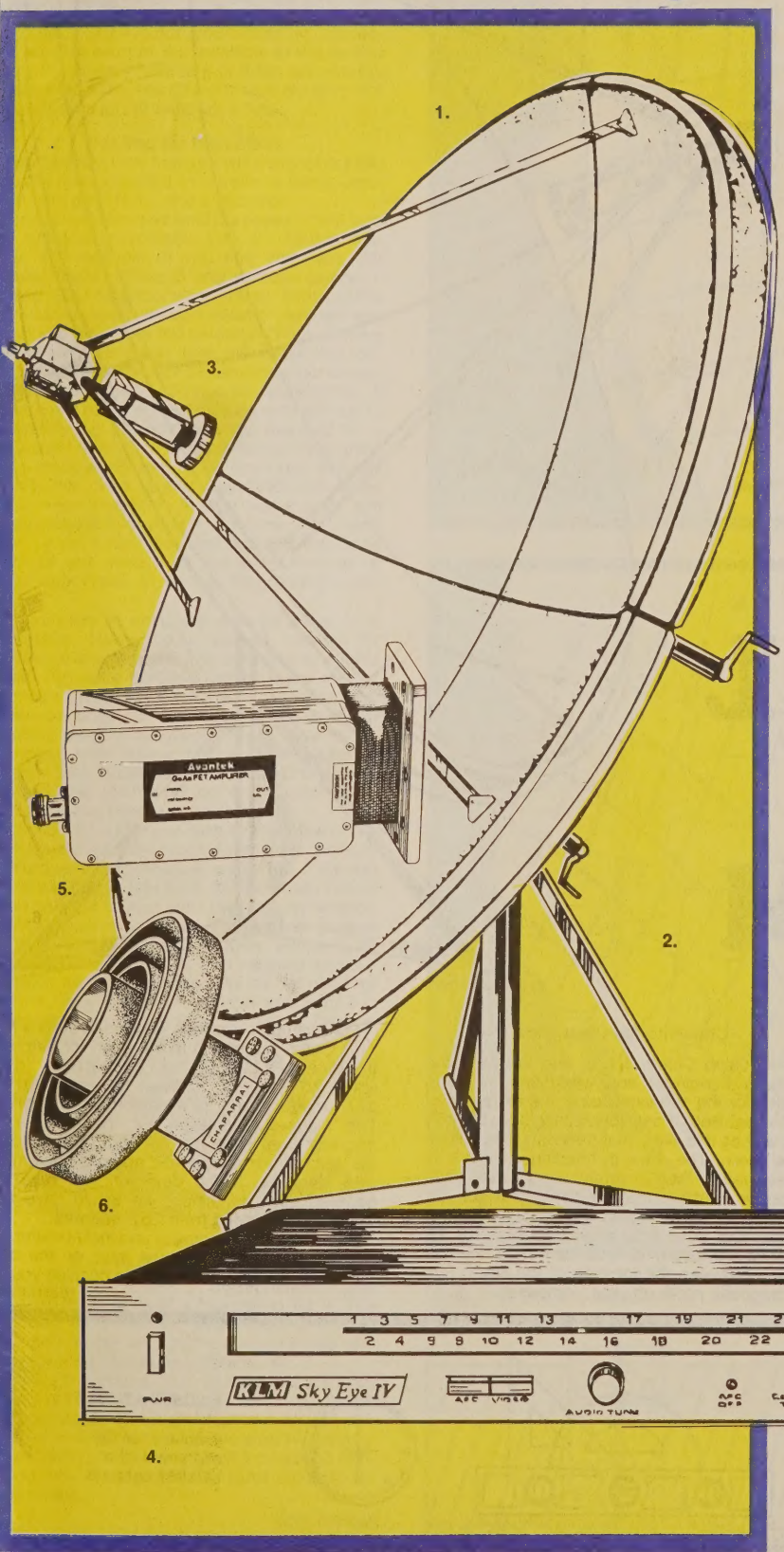
13 FOOT PARABOLIC

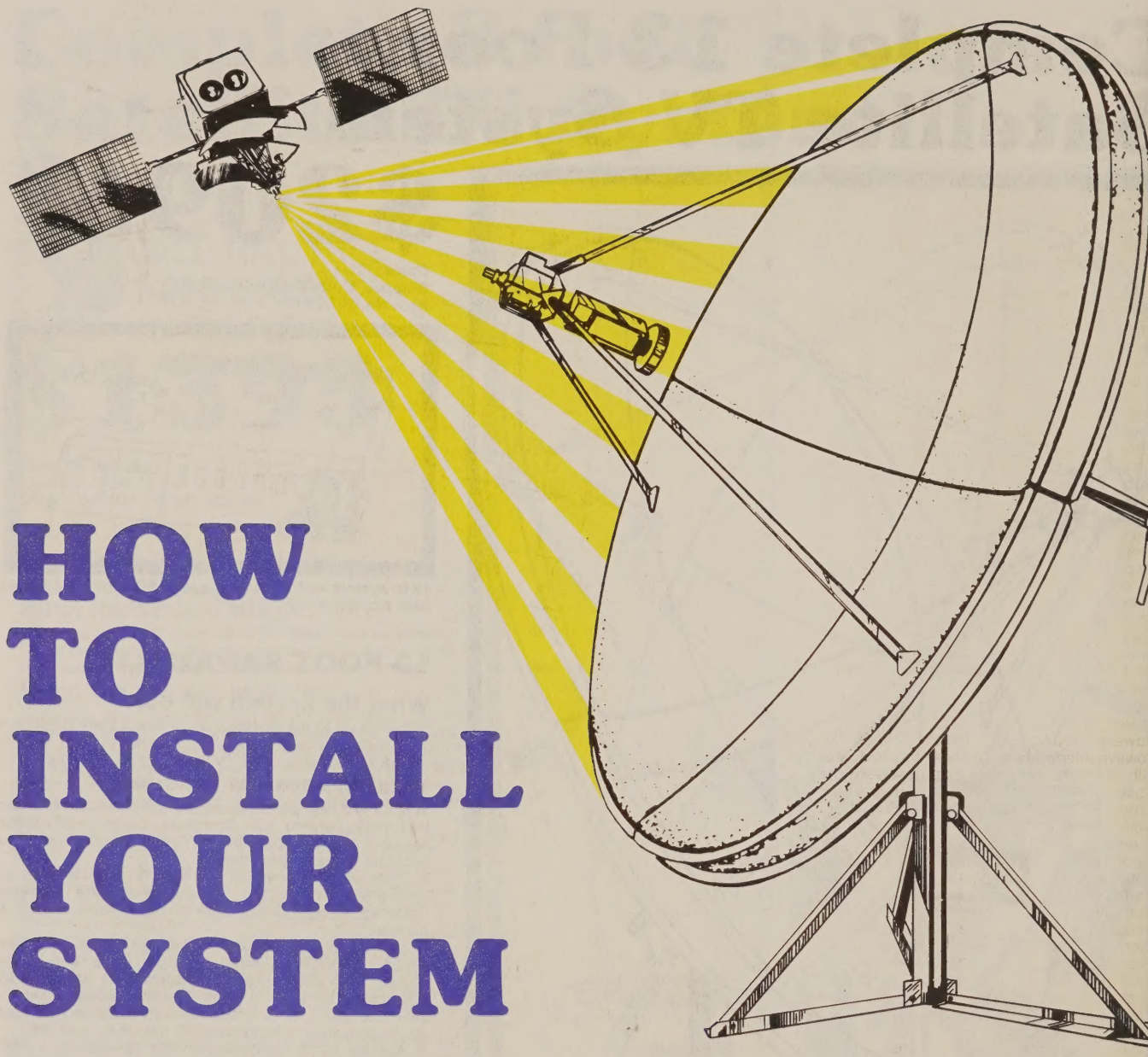
What the system will do:

Receives up to 60 channels of TV direct from satellites to your home receiver. Movies, sports, cultural events, religious programs, other TV stations and much more.

What the system includes:

1. A 13 foot high-performance satellite dish made of reflective metal bonded with fiberglass. Completely weather resistant and is virtually maintenance-free. Comes in four sections for easy assembly.
2. Polar mount, complete with azimuth and elevation adjustments for precise satellite-to-satellite tracking. Patented linkage allows dish to travel from horizon to horizon.
3. LNA mount complete with rotor for turning LNA from horizontal to vertical polarity. Extension poles not included.
4. KLM SR-4 satellite receiver. Consists of two parts, the downconverter and receiver. Satellite receiver features slide rule tuning, AFC defeat, video inversion and the latest single-conversion electronics. RF modulator optional.
5. Avantek 4215 low noise amplifier. Consists of a 120° degree uncooled LNA. Takes the weak signals reflected by the dish and amplifies them prior to being sent to the down converter. Uses GaAs FET transistors for maximum performance. Power supplied through coax line. Urethane coated for weather proofing.
6. Chaparral feed horn. Provides 0.5 dB gain over conventional rectangular horns. Virtually eliminates system noise.
Note: Customer provides all cables (approx. cost $80). VCR may be used as RF modulator, otherwise RF modulator required (approx. cost $48).





HOW TO INSTALL YOUR SYSTEM

Finding a Good Site

Your first major task is finding the proper spot for your antenna. You must locate your antenna so that the space between it and the satellites is free from physcial obstructions such as trees and buildings. With an inexpensive compass and a protractor or inclinometer, you will be able to check the "view" (line of sight from antenna to satellites) from various spots on your property. (See ill. 1) Any obstructions which block your view of the satellites can seriously affect, and in many cases, prevent reception. Live trees are probably the worst offenders, due to the high water content of their leaves and branches. I have actually seen an antenna installed aiming through trees. In the fall, when the trees were bare, the reception was quite good, but when spring arrived and the leaves sprouted, the picture began to deteriorate until by summer, when the trees were in full bloom, it was unwatchable. If you are forced to choose between aiming through a house or a large tree, it would probably be best to aim through the house. (See "Terrestrial Interference")

Checking for Clear View

First, using Charts 1 & 2, find the azimuths (compass headings) and elevations in North America for the two satellites at the extremes of the Domsat Belt. If possible, allow room beyond each end as it is likely that new satellites will be added there. The azimuth headings are in true degrees rather than magnetic, so you will have to add or subtract the magnetic deviation for your area in order to find the proper compass reading. Call your local airport and ask for the magnetic deviation; or you can note the difference between the location of the North Star and magnetic north on your compass.

For example, suppose you live in central N York State. According to the chart for Satco this satellite's azimuth from central New Yor about 252 degrees (halfway between 250 255 degrees) and its elevation is 15 degre The magnetic deviation for the area is degrees west (or plus). We add 14 degree the azimuth for a magnetic compass bearin 266 degrees. If the deviation had been degrees east, or minus, we would have s tracted 14 degrees from 252 degrees.

Now, take your compass and inclinometer sight along the 266 degree mark on the c pass. Use a carpenter's level to position you

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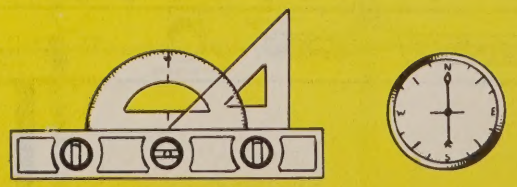

ILLUSTRATION #1 shows the tools required for the alignment of a satellite antenna.

struments parallel to the ground. Find the 15 degree mark on the protractor or inclinometer and look along it into the sky. If there are any obstacles between you and the sky, keep trying different locations until you find a clear view. Check the opposite end of the Domsat Belt by following the same procedure for Comstat D-2. The line of sight for the entire area between these two satellites should also be free from obstructions; if it is you will probably have no problems, but if it is not, you should do a reception test for each of the satellites in the belt to see if the signals from any of them will actually be affected. The line-of-sight test alone is not accurate enough to determine this.

Testing for Reception

For the reception test you will need a portable antenna (one mounted on a trailer is best), complete with an L.N.A., and a receiver.

The test will serve several purposes. It will help you solve any problems you are having with view. For example, if you find you have the choice of aiming through your wooden garage or through your neighbor's apple tree, a look at the pictures received at each location will tell you which site is best for the antenna. Often, moving the antenna only ten feet will make the difference between a poor picture and a good one.

Here are a few guidelines for foundations. If you are in a rocky area, it may be very difficult to accurately dig the narrow holes required for a three point mount. What starts out as three small holes could easily end up as one huge excavation! In this case, a slab foundation would be much more practical. A high water table will cause problems for post foundations. The posts must be set below the frost line and the holes might fill with water. As the water freezes in winter and thaws in spring, the ground could heave.

If you live in an urban area or close to a microwave tower, you should check for microwave interference. The best way to do this is with the same portable system used for the reception test. The presence of microwave interference does not rule out the possibility of watching satellite television. There may be interference with only a couple of the satellite transponders (channels) and an on-site test will let you know whether or not the amount of interference you have can be tolerated.

If you are sure that you have a clear view of the satellites but are concerned about the possibility of microwave interference, make the following simple test before you go to the expense of moving an antenna to your site. Test for interference by hooking up your L.N.A. and receiver to your television set or a monitor: you do not need an antenna. Take the L.N.A. and receiver to your television set or a monitor; you do not need an antenna. Take the L.N.A. outside and point it in all directions while watching the set. If there is no interference, you will see a constant snowy pattern on the screen: interference will cause horizontal bars. Test all channels. If bars show on more than one of them, you should do a reception test (with antenna) for each transponder of every satellite. If your test detects a lot of interference, you can use shielding and filtering techniques to reduce it. (See "Terrestrial Interference") Experiment with these before your antenna is permanently installed!

A Firm Footing for Your Dish

Once you have settled on a good antenna site, your next job is to build a foundation for it. The two basic mount styles, single pole and three point, can be put on either a concrete slab or a concrete post foundation. (See Ill. 2)

In soft, dry ground, post foundations are ideal as they use less cement and can be dug with a post hole digger. In all other cases a poured slab is better. A slab requires a very shallow excavation and with good drainage and embedded reinforcing rods, it will provide an excellent base for any antenna.

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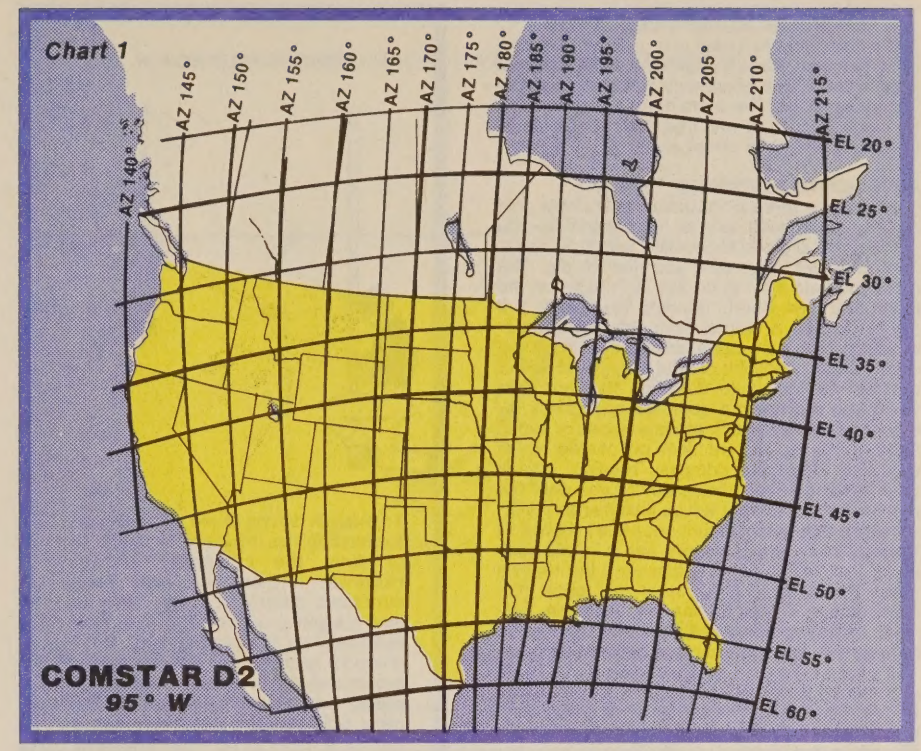
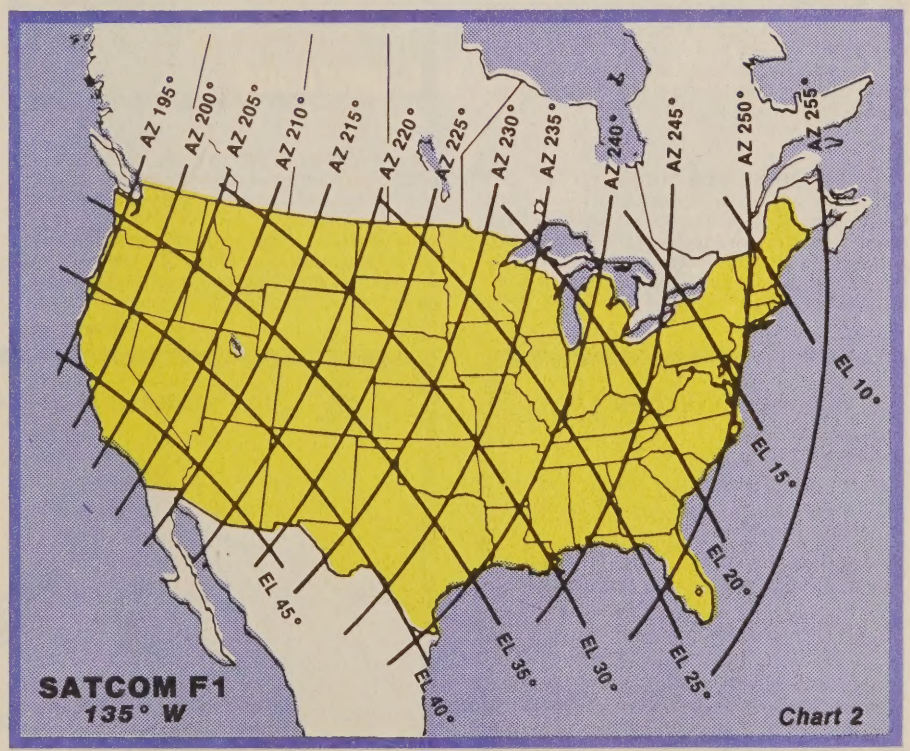
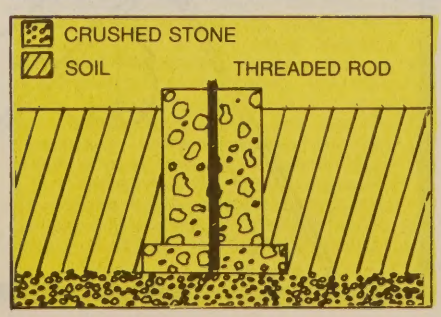
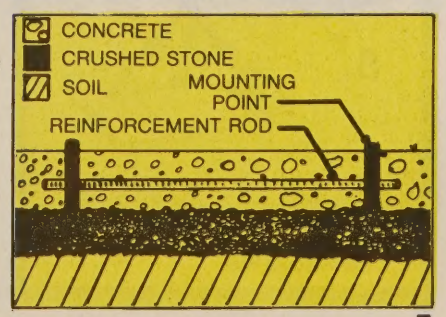








THE POLAR MOUNT FOUNDATION

It is important to install your polar mount properly because this will determine whether or not your antenna will accurately track the geostationary satellites. There are three adjustments to be made: alignment with true north, polar elevation angle and polar offset angle.

TRUE NORTH ALIGNMENT

If you have a three point mount or a single pole mount whose polar axis is not adjustable, you will have to align its foundation with true north. Find your bearing before you start to dig. The most accurate way to do this is to sight on the North Star (see insert: "Finding True North"). If the North Star is hidden from view by trees or buildings, you can use a compass and still get good results, if you are careful. Be sure to add or subtract the magnetic deviation for your area when you are using a compass and check for any iron structures such as water pipes or septic tanks. Some mounts are made out of steel which can also affect the compass reading. Check your heading several times before you pour the cement because there will be little margin for error with a three point mount once it is installed. A three point mount is usually set in a triangular base, the north/south line bisecting the triangle (see illustration 3.) Be sure to follow the manufacturer's instructions for distance between mounting points and the hardware needed for insertion into the concrete before you pour.

If your single pole mount requires true north alignment, follow the manufacturer's instructions to determine exactly which antenna piece must be so aligned. For instance, if the antenna has a polar pipe, it will coincide with the polar axis (the line between the pivot points at the back of the reflector) and this part should be aligned with true north.

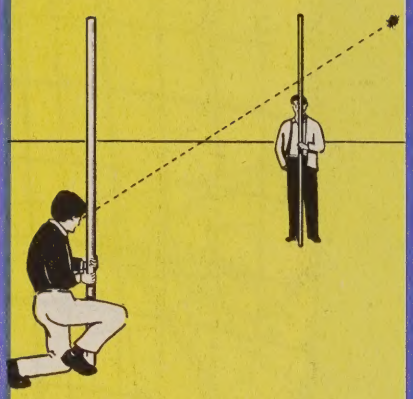
If the antenna has no polar pipe, you will have to line up the polar axis (which will be an imaginary line) with true north.

ELEVATION OF POLAR AXIS

The polar axis is a line formed by the upper and lower pivot points of the reflector. This axis must be adjusted to point exactly at the North Star; it should form an angle with the ground equal to the latitude of your site. You can make this adjustment by using an inclinometer. (See Ill. 4) By doing this, you can set the north/south alignment and Polar elevation of the antenna simultaneously. If because of the construction of the antenna, it is impossible to sight along the pivot points, you can make a temporary sighting device out of stiff wire or metal mounted at the pivot points and extended to clear any obstructions on the antenna or mount. The extensions must be equal in

(continued)

FINDING TRUE NORTH



True North can be found by adding on subtracting the magnetic deviation to or from the compass reading. However, if there are large steel structures nearby you may have to take a sighting of the North Star. Find two poles six to eight feet long. Push one pole securely into the ground approximately ten feet south of your proposed site. Have a helper hold the other pole in place about ten feet to the north. Sight along these two poles and have your helper move back and forth until the two poles are aligned with the North Star. Now you have found a True North/South axis.

length and the new sighting line must be parall to the line made by the pivot points.

If you are concerned that your measuremen are not accurate enough, you can mount th antenna temporarily with cement blocks, san bags or on a wooden platform. Check the recep tion from each satellite to make sure the antenn is tracking properly before you dig your perma nent foundation. Try not to leave the antenna o this temporary foundation as the antenna cou easily be blown over by a strong wind.

OFFSET ANGLE

This last adjustment will enable your pola mount to track the geostationary satellites ac curately while rotating the antenna in only on plane. It cannot do this if the reflector's face parallel to the polar axis; the offset angle tel you the number of degrees the dish must b tilted away from the polar axis.

Not all polar mounts have an adjustable offs angle. Some have none at all and will track ac curately only if they happen to be at the equato Other mounts have built-in offset angles, usual 4 degrees. This offset is designed for the midd U.S. and tracking errors will occur at extrem latitudes.

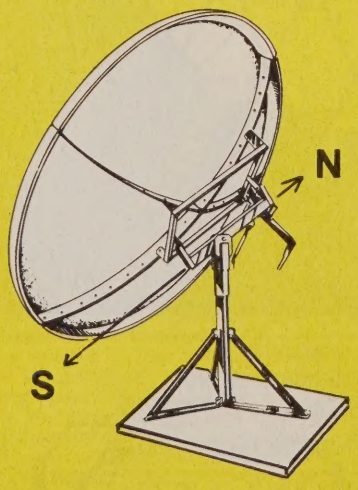
Of course, the most accurate mounts have ad justable offset angles. The following will tell yo how to set yours properly.

We have included a chart of North America latitudes and the offset angle required at each. you do not live in North America, or if you real enjoy math, here is the formula we used to com pile the chart:

$$\text{offset angle} = \arcsin \frac{R (\sin \text{lat})}{D + 4000 (1-\cos \text{lat})}$$

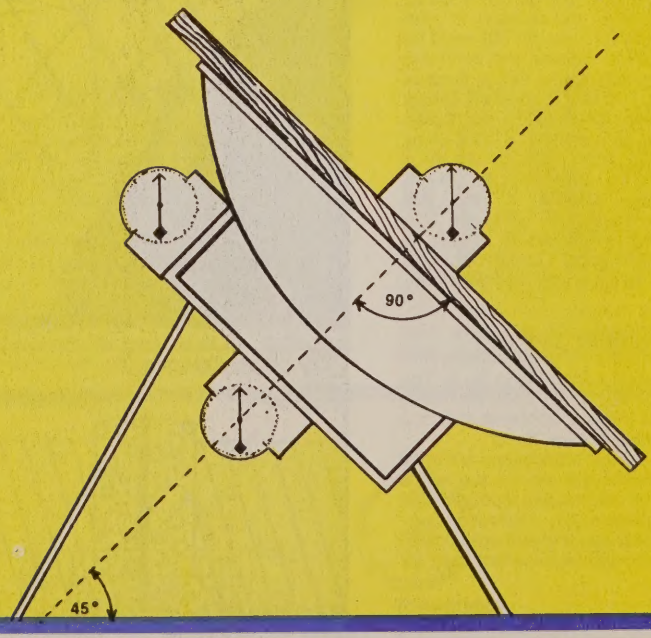
$$= \arcsin \frac{4000 (\sin \text{lat})}{22{,}300 + 4000 (1-\cos \text{la}}$$

Ill. 3 TRUE NORTH ORIENTATION



The single pole polar mount must be aligned with True North. To accomplish this, the center bar must be oriented to coincide with the North/South line.

Ill. 4 MEASURING ELEVATION USING AN INCLINOMETER



$$= \text{arc sin} \frac{4000\ (.643)}{22{,}300 + 4000\ (1 - .766)}$$

$$= \text{arc sin} \frac{2572}{23236} \qquad = \text{arc sin } .1107$$

= 6.35 degrees

D = distance from satellite to equator
R = radius of the earth

Here is an easy way to find the shim dimension: the distance your antenna support should be from the polar axis to form the proper offset angle. (See Ill. 5) Measure the distance between the mounting points of your antenna (line AB in the illustration). Use this figure in the following formula:

X = tan (offset angle) x AB

Here is an example using an antenna at 40 degrees latitude whose mounting points are 48 inches apart.

X = tan (6.3) x 48" = 5.3"

When you have found "X", measure from point A to point C on your antenna. Be sure to find and measure from the rotation point. Add this figure to "X" to find the shim dimension (BD in the illustration) and adjust your antenna accordingly.

This method works if the mounting points of the antenna are centered on the back. You probably have this type since it is by far the more common. If not, you will have to use the method described below. You may want to try it anyway to check the accuracy of your measurements and calculations.

Place a long board across the middle of your antenna so that the ends of the board rest on the edges of the antenna. Attach your inclinometer to the center of the board and rotate the antenna to the point where the inclinometer reads highest. Now, tilt the antenna down until the reading on the inclinometer is your latitude plus the corresponding offset angle. If, for insistance, your latitude is 40 degrees, the correct reading is 46.04 degrees. Your inclinometer will not allow you to set the angle to get within one degree.

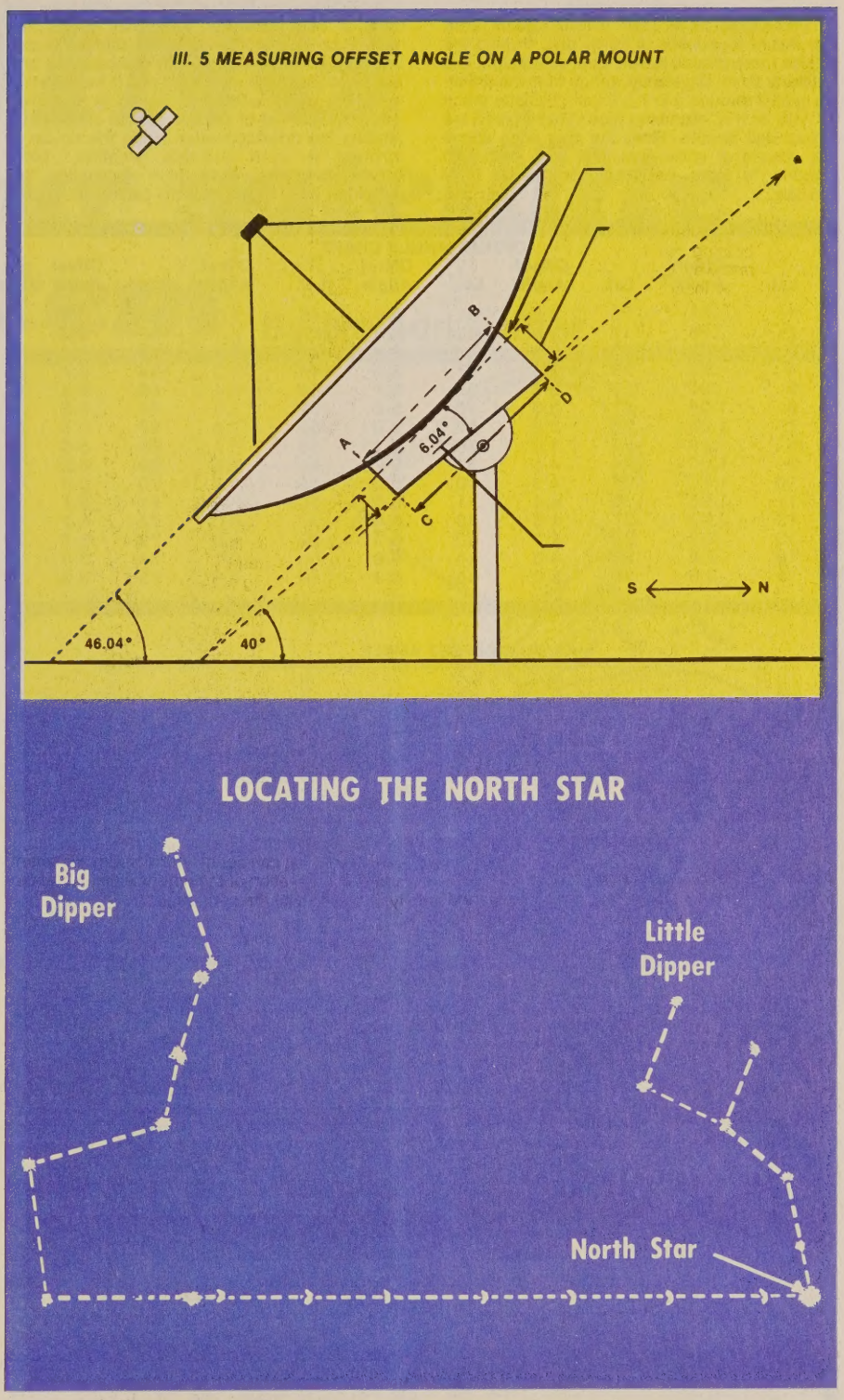
Now that the antenna is mounted, you are ready to install the L.N.A. and connect the cables.

What About Cable?

There are many misconceptions about L.N.A.s, receivers and their effects on the length or type of coaxial cable which can be used to connect them. This stems from a confusion about receiver sensitivity, threshold and CNR.

If you have a basic understanding of the CNR (carrier to noise ratio) of antenna/L.N.A. combinations, you will note, looking at the formula, that the gain of the L.N.A. does not affect it, but the noise temperature of the L.N.A. does. The L.N.A. actually degrades the CNR because it adds noise to the system.

$$CNR = \frac{EIRP - PATHLOSS + ANTENNA\ GAIN}{BOLTZMAN'S\ CONSTANT + LNA\ \&\ ANTENNA\ NOISE + IF\ BANDWIDTH\ NOISE}$$



Sensitivity is another matter. The sole purpose of the L.N.A. is to amplify the signal received by the antenna to a level which exceeds the minimum sensitivity requirements of the downconverter. Unfortunately, few manufacturers publish usable minimum sensitivity specifications for their receivers and it is this specification which determines the type and length of coax that can be used between the L.N.A. and the downconverter of the receiver. In other words. It tells you the amount of signal you can afford to lose through the cable: L.N.A. gain minus coax losses must exceed receiver sensitivity. For example, assume that the antenna/L.N.A. is saturated: that is, the antenna is delivering a sufficient CNR signal to deliver noise-free reception to a particular receiver. We are assuming a CNR of 8 to 10 dB from the antenna/L.N.A. and a receiver threshold of 7 dB. The threshold figure of the receiver tells the ratio of signal-to-noise required for good video reception, but does not indicate the amount of this ratio needed. If the L.N.A. has 50 dB gain and your coax/connector losses are 30 dB, there will be 20 dB of gain remaining. This should be sufficient for most receivers.

(continued)

LNA GAIN MINUS COAX LOSSES MUST EXCEED RECEIVER SENSITIVITY!

Installing Cables

You should install your outdoor cables while the mount foundation is being dug. Putting the cables underground keeps them out of sight and protects them. Dig a small trench from the antenna cables through a 2-2 1/2 inch diameter piece of ABS or PVC plumbing pipe. These pipes are cheap and flexible. Bring the pipe ends above the ground or snow level and seal them with silicone to keep out water and small furry animals.

If your receiver has a properly weatherproofed remote downconverter, you may mount the downconverter at the rear of the antenna. It may need a second weatherproof enclosure to prevent condensation inside the unit if the distance from the antenna to your house is less than seventy-five feet or so, you should consider installing the downconverter inside the house to protect if from extreme weather. Most downconverters will function well using this length of good quality RG 8U cable with a standard 50 dB gain L.N.A. Expensive coaxial cabl are available (RG 6U, RG-213, RG-214, RG-217), but they are unnessary for most stallations.

This is the time to install as many cables as y need at the moment as well as those you thi you might need in the future. The avera system requires a five conductor cable for t polarity rotor, an eight conductor cable for t motorized drive, and a coaxial cable for t L.N.A. and receiver. It is handy to install ex conductors in case of cable breakdown system expansion. Even if you do not have motorized mount now, put in a cable for one will be a lot cheaper and easier than digging your pipe and installing the cable later on. Y may also want a 110 V outlet at the antenna fo light or power tools in case you need to work the antenna.

Antenna Assembly

Now you are ready to put your anten together. You will be following t manufacturer's instructions supplied with yc unit, of course, but these suggestions shou make things easier for you. Be sure all the har ware is plated or painted for rustproofing. If yc antenna is sectional, make sure all joints a smooth and even. If you have a pattern template, check the antenna's curve and ma any needed adjustments, if possible. If yo antenna's steering mechanism has thread rods, screw jacks or telescoping legs, coat the liberally with grease to prevent rusting and se ing. Make sure you securely install and carefu weatherproof your exterior cable connecto -especially the "N" type coaxial connectors be ween the L.N.A. and receiver or downconverte Any moisture in these can ruin your receptio Allow for enough slack in the cables to a comodate L.N.A. rotation and secure the cabl to the mount so they will not pull on the conne tors.

Your system is now ready for its final alignme and tuning. Read our article, "Turning Yo System" for step-by-step procedures.

Compliments of Satellite TV Magazine

OFFSET ANGLE CHART

Lat.	Offset Angle	Lat.	Offset Angle	Lat.	Offset Angle	Lat.	Offset Angle	Lat.	Offset Angle
1	.01	16	2.8	31	5.1	46	7.0	61	8.3
2	.36	17	3.0	32	5.3	47	7.1	62	8.3
3	.54	18	3.1	33	5.4	48	7.2	63	8.4
4	.72	19	3.3	34	5.5	49	7.3	64	8.4
5	.90	20	3.5	35	5.7	50	7.4	65	8.5
6	1.07	21	3.6	36	5.8	51	7.5	66	8.5
7	1.25	22	3.8	37	6.0	52	7.6	67	8.5
8	1.43	23	4.0	38	6.1	53	7.7	68	8.6
9	1.60	24	4.1	39	6.2	54	7.8	69	8.6
10	1.78	25	4.3	40	6.3	55	7.8	70	8.6
11	1.95	26	4.4	41	6.5	56	7.9	71	8.7
12	2.13	27	4.6	42	6.6	57	8.0	72	8.7
13	2.3	28	4.7	43	6.7	58	8.0	73	8.7
14	2.5	29	4.8	44	6.8	59	8.1	74	8.8
15	2.6	30	5.0	45	6.9	60	8.2	75	8.8

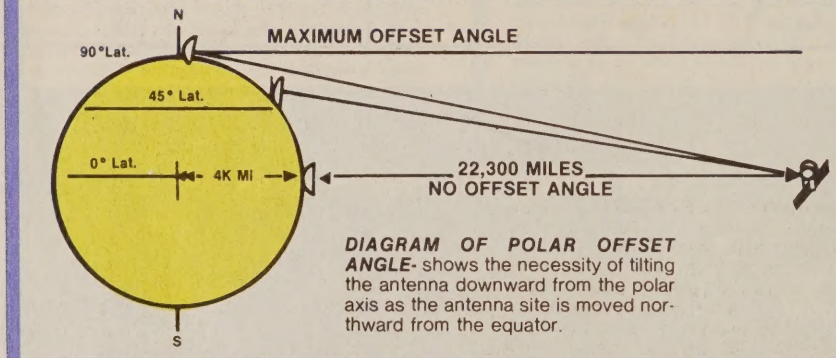
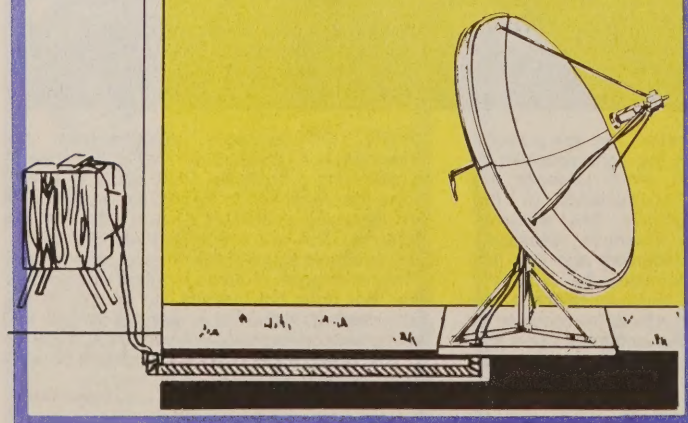


DIAGRAM OF POLAR OFFSET ANGLE shows the necessity of tilting the antenna downward from the polar axis as the antenna site is moved northward from the equator.

IS YOUR CABLE TOO LONG

There is an easy way to find out if your coax is affecting your reception. Choose a satellite and check the reception from each of its transponders. If the reception from any of them is noise-free, your cable is not too long. If it were, the loss would add noise to every transponder's signal. If pictures from every transponder have sparkles, and if you are using an antenna and L.N.A. adequate for the footprint in your area, your coax or receiver is probably at fault. Take your television and receiver out to the antenna and connect them to the L.N.A. with a short piece of coax. If the picture improves, you are either losing too much signal through the cable or your receiver lacks sensitivity. Have your receiver checked or compare it with another unit, and use a shorter or lower loss coax.

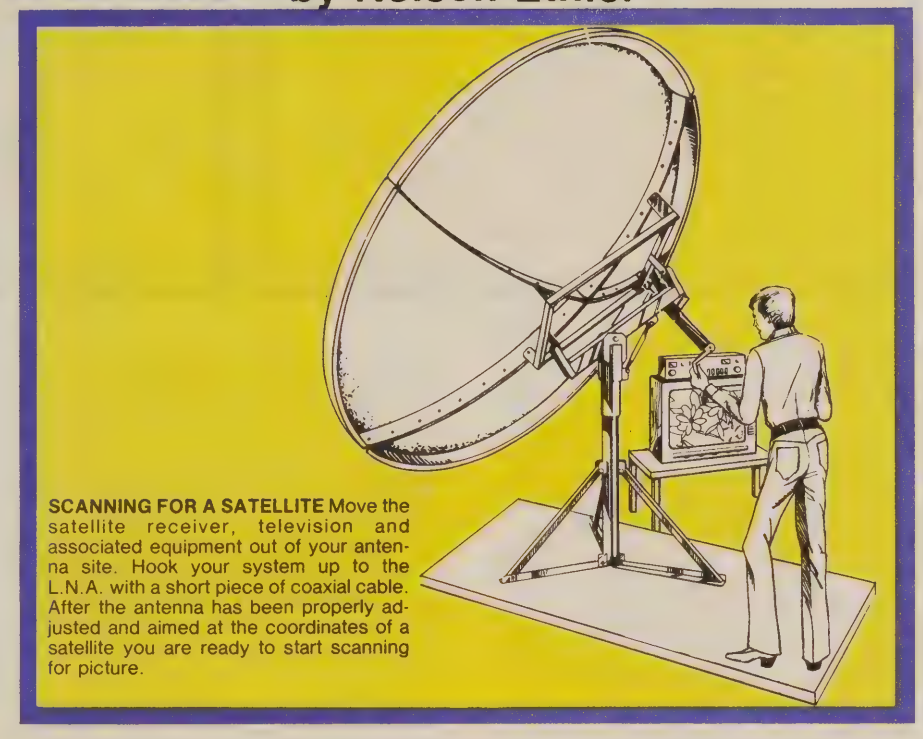


CHECKING FOR CLEAR VIEW

A person is shown using a table, compass, level and protractor to check his proposed antenna site for clear view of the satellites. Remember to check both extremes of the satellite belt. If you are in doubt as to whether or not your view is clear, you might have to opt for an on-site reception test using a portable antenna.

TUNING your satelllite TV system

by Nelson Ethier



SCANNING FOR A SATELLITE Move the satellite receiver, television and associated equipment out of your antenna site. Hook your system up to the L.N.A. with a short piece of coaxial cable. After the antenna has been properly adjusted and aimed at the coordinates of a satellite you are ready to start scanning for picture.

By now, all the hard work of installing your system is complete. The antenna has been assembled and mounted and the cables have been laid. Now you must adjust the antenna feed and point the antenna at the satellites.

The job will be easier if you move your receiver and TV set outside to the antenna. Use a short cable to connect the L.N.A. to the receiver if your long cable is already installed underground. Before you try adjusting the antenna, make the following tests to roughly determine if your receiver and L.N.A. are working.

Watch the television as you run the receiver through all the channels. If the receiver is working, the screen will flicker slightly as you switch channels.

To check the L.N.A., watch the television screen carefully as you turn the L.N.A. power switch on and off. There should be a very slight change when the L.N.A. power is on.

If there is absolutely no microwave interference in your area, you may see only a slight flicker as the power to the L.N.A. is turned on and off. If you cannot see any change whatsoever, measure the current being drawn by the L.N.A. by using a milli-amp meter in series with the supply voltage to the L.N.A. You may have to go inside the receiver if the unit does not operate with an external DC block power supply. Most L.N.A.'s draw 75-100 milliamps. If your L.N.A. is drawing current, it is proably functioning. If it is drawing no current at all, check the voltage at the L.N.A. by removing the "N" connector from the back of the L.N.A. and checking the voltage with a multimeter. Set the meter on the 25 volt DC scale. Place the positive lead on the center pin of the "N" connector and the negative lead on the case of the connector. The meter should read between 15 and 24 volts. Be very careful not to touch the center pin of the "N" connector and the case at the same time with the positive lead of the voltmeter. If you do, you will short the power supply and possibly damage your receiver. This test confirms that the L.N.A. power supply is functioning and that the cable and connectors are probably good. When you think your electronic components are working, you are ready to start aligning the antenna.

We are assuming that the antenna's surface has been aligned and adjusted as accurately as possible by using a parabolic template or other method suggested by the manufacturer.

The first step in antenna alignment is the rough adjustment of the focal length, feedhorn centering and polarization.

ROUGH ADJUSTMENT OF FOCAL LENGTH

The manufacturer's instructions tell you the exact distance the feedhorn should be from the center of the reflector surface. If they do not, you can calculate the focal length if you know the F/D ratio of the dish. The focal length equals the diameter of the reflector multiplied by the F/D ratio.

Focal length = Diameter X F/D

The distance from the center of the reflector to the mouth of the feedhorn should be 2" less than the focal length as calculated or supplied by the manufacturer.

CENTERING THE FEED

It is absolutely essential that the feed be centered before you try for a picture. You may get a picture even if the feed is off-center, but the dish will be incorrectly aimed and you will have less than optimum gain. When the feed is off-center, the dish performs like an "off-center parabola" or a spherical antenna. This becomes a major problem when the dish is used on a polar mount, since it must operate in a single arc to track satellites. If the feed is off-center, this arc will have to be corrected to compensate for the misaiming necessary to obtain pictures. Since so many adjustments are necessary for aligning a dish, the feed should be accurately centered at the start to eliminate future tracking problems.

Some people are able to just look at a feed and tell whether or not it is centered. Others think they have this gift but do not! Many try to adjust the feed position for best picture, but this is a poor method because you might be adjusting the feed to compensate for a slight aiming error of the entire reflector surface. I strongly believe in centering the feed according to careful measurements.

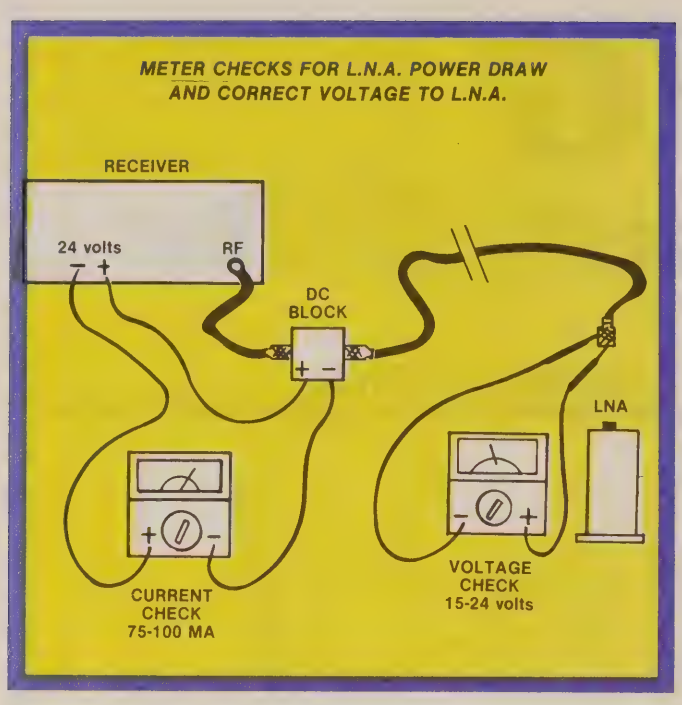
The easiest and most accurate way to center the feed is to find three equidistant points on the perimeter of your antenna and measure the distance from each of them to the center of the feedhorn. If the feed is centered, all three measurements will be the same. If your figures are different, add them and divide by three to find the average. For example, measurements of 94", 92" and 96" are averaged as follows:

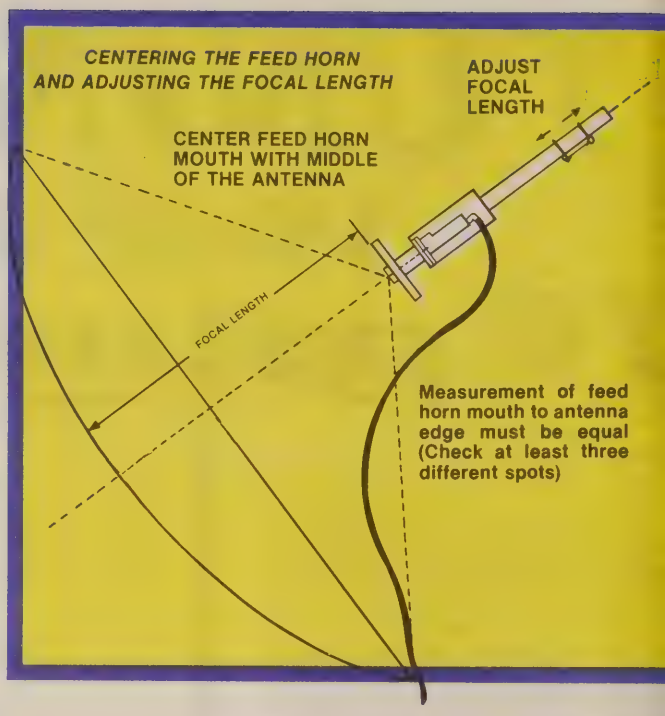
$$\frac{94 + 92 + 96}{3} = \frac{282}{3} = 94''$$

You would center the feed by placing it 94" from each of the three points on the antenna.

Your next step is to assure that the feedhorn is not only centered but also aimed at the center of the dish. This can be more difficult. Some feedhorns can be mounted without the L.N.A., attached. If you are lucky enough to have one like this, use the boresighting method. Remove the L.N.A., mark the center of the dish with a felt pen, and with your head about two feet away from the back of the feedhorn, look through it and line up the feedhorn with the mark on the dish. If you cannot use this method, you will have to make an alignment jig or align the feed by eye and guess. If you find you have to rely on the latter method, wait to do your aligning until you have a picture. The procedure is discussed later in this article.

(continued)





ROUGH ADJUSTMENT OF POLARIZATION

This adjustment is not critical and a rough guess will suffice when you first start looking for pictures. If the satellite you are trying to tune in is transmitting on both polarities, the worst possible polarity error will be 45 degrees, not enough to eliminate the picture. To reduce this margin even further, adjust the L.N.A. polarity so that it is at the same angle to the ground as the latitude of your antenna site. In other words, if you live at 37 degrees latitude, adjust the L.N.A. so that either the flat or the narrow side (there is no up or down side) is at roughly a 37 degree angle to the ground. If you do not already have an inclinometer, you should buy one since it and a compass are almost necessities for aligning earth stations. Both can be purchased at good hardware or department stores.

Place the inclinometer on the flat or narrow side of the L.N.A. and look for readings of approximately 37 or 143 degrees. Either of these readings will indicate that you are in the right polarity range. The L.N.A. receives equally well with either side up. This polarity adjustment is not critical and misalignment of up to 20 degrees will not noticeably degrade the picture.

ADJUSTMENT OF THE MOUNT

If you own an Az-El mount, there is really no further set-up required and you can skip to the section called Aiming Your Reflector. If you own a polar mount, there is some alignment necessary before you can begin seeking satellites.

POLAR MOUNTS

You must make two basic adjustments on a polar mount. The first is the aiming of the polar axis and the second is the determination of the offset angle required to tip the dish downward (for locations above the equator). We will assume that when you installed the foundation you made the necessary allowances for adjusting the polar mounts have two pivot points (the ADM mount is an exception). A line between these two points can be referred to different types of polar mounts. The main ones are: the single pole (used on the Comtech 10' and others), the tripod mount favored by commercial companies such as Scientific Atlanta, and the rotating head polar mount which can also function as an Az-El mount.

SETTING THE POLAR AXIS

Refer again to "Installing Your System" to find the information necessary to set the polar offset angle. Once this adjustment is made, it will not require fine tuning after a picture is obtained unless it was originally done incorrectly.

If you are lucky, you will find someone who has done several installations to help you with yours, but it is nice to have another person there, even if he or she only provides moral support! Grasp your copy of Satellite TV in one hand and your compass and inclinometer in the other; it is time to seek your first satellite television picture.

The first rule is that no matter what happens, DON'T PANIC! Recheck the instructions which came with your equipment and the instructions in this article. If your still run into problems, phone the person who sold you the equipment and ask his advice. If this does not help, contact the manufacturer directly.

WHERE IS THAT SATELLITE?

The best satellite to begin with is Satcom F-IIIR. It has the greatest number of active TV transponders, including most the cable programming. It also broadcasts on both polarities so there is little chance of missing it if your polarization is 90 degrees out of adjustment. There is a computer printout included in this magazine which gives the satellite aiming coordinates (azimuth and elevation) for all of the United States as well as for most of Canada and Mexico. Establish the latitude and longitude at your receiving site and simply look them up in the guide. To help you calculate the elevation and azimuth for the other satellites, we are including formulas you can use with a scientific calculator. You may wish to have all the satellite coordinates for your location without bothering to run the complicated formula on your calculator. Computer programs are available that will allow you to obtain a printout of this information if you have access to a computer which uses "Basic" computer language. Most home computers, such as Apple, Radio Shack and Commodore, use this language. Several companies offer this computer service for a small fee. By far the easiest way to have any and all satellite coordinates at your fingertips is to buy a copy of the Global Antenna Aiming Coordinates. This will give you the coordinates for all geostationary satellites now in orbit and for any satellites possible in the future. The book covers the world-wide geostatonary belt in increments of one degree. Even if a satellite is moved, you will be able to instantly determine new coordinates.

If your polar mount is well aimed all you will need to adjust is the elevation. It never hurts to have both coordinates, though, so you can check the accuracy of the polar axis setting. You must have both coordinates for aiming an Az-E mount, because the azimuth and elevation mus be set separately.

AIMING THE AZ-EL MOUNT

Though most Az-El mounts used in home systems adjust with hand cranks, a few need wrenches and screwdrivers.

To set the elevation, place the inclinometer on a surface which is parallel to the face of the dish Usually, a part of the mount will serve this purpose, but if there is no parallel surface, a board or piece of light tubing can be placed across the face of the antenna. You may wish to permanently install an inclinometer on your dish to give you a fast reference for elevation. Most inclinometers are made of plastic and will weather well, but avoid ones with cardboard scales, if you intend to use yours outdoors. With a little ingenuity, you can improvise your own inclinometer by using a plastic protractor with a pointer suspended from its center.

To set the elevation, all you have to do is crank or adjust the dish so the inclinometer measures the same number of degrees as the required elevation.

You should use a compass for finding the azimuth. Remember to allow for the magnetic deviation for your area and be sure that you are not near metal objects which could deflect the compass needle and give you a false reading. Adjust the azimuth of your dish with the hand crank or manually. When you are close to the proper heading, turn on the L.N.A., receiver and television - the big moment is about to arrive.

AIMING THE POLAR MOUNT

If you have your offset and polar axis properly adjusted, your mount need only be set at the proper elevation. Do the same as for the Az-E mount: turn on your equipment and raise the antenna to the elevation of the satellite.

SATELLITE SEARCHING

It is always a good idea to have two people on hand - one does the antenna aiming and tweaking while the other searches for satellite signals by moving the channel selector of the receiver back and forth. It is also a lot of fun to share this first satellite television experience with a friend.

If your area is free from microwave interference, the first hint of diagonal lines on the screen indicates the presence of a satellite picture waiting to be tuned in. If you have a fairly

(continued)

ood picture, you are ready to do the final ne-up. If you have no picture at all, you will ve to scan for satellites. If you have a faint pic- re and cannot tune it in, there may be crowave interference in the area. A satellite cture will disappear if the antenna is moved ore than a couple of degrees off target; icrowave interference will fade in and out as e antenna is moved over a wide range of posi- ons. If you have this type of interference, fin- ng the satellite is going to be a lot more difficult ecause you will have to search for the picture hile trying to ignore the interference. In this tuation, you have to scan through the in- rference with the receiver, nothing the nature the interference and the location on the chan- el tuner. Try to establish if there is a relatively ear section in the tuning range where in- rference does not seem to be present; do your canning for satellites in this area.

HOW TO SCAN WITH AN AZ-EL MOUNT

The first thing to do if you cannot find the atellite when you have adjusted your antenna to ie coordinates is to recheck your aiming with ie compass and inclinometer. If your calcula- ons prove accurate, it is time to try a scan in the mediate area where you expect a satellite to e. It is a good idea to mark your starting posi- on. This can be done by marking the hardware ith a felt tipped pen so that the original position an be recovered. Leave the elevation alone and tart by scanning with the azimuth, since your rror is most likely in the compass reading. It is nportant to establish a system for scanning or ou will be looking all over the sky, perhaps issing the elusive position. As you start to scan gain, have someone turn the receiver channel elector back and forth. Go five degrees to the ft in increments of one degree as you look for a icture, if you are still unsucessful, return to the riginal position and, using the same technique, rn five degrees to the right, if you find nothing, eturn to the original position. Now move the levation adjustment so that the antenna is two egrees lower. Use the same search technique, oving the antenna five degrees to the left and ght. Move the dish down another two degrees nd repeat the procedure.

Next, move the dish two degrees higher than s original position and scan left and right. If you till cannot get a picture, try the whole pro- edure over again, this time scanning ten egrees left to right at each elevation increment.

If your sceen is still blank after all this, you are trouble. Check your equipment again accor- ing to the procedures outlined at the beginning f this article. If you are in doubt as to whether or ot a particular component is working, the asiest way to find out for sure is to try the piece someone else's working earth station. If you ant to do this, you might as well check all your omponents, including cables.

If your electronic equipment turns out to be unctioning properly, the problem is with your ntenna. Recheck its focal length to make sure ou are within an inch of the proper distance. In lmost all cases where there is no picture at all, ie problem turns out to be that the antenna is ot pointed at the satellite. Recheck all the aim- ig coordinates of your antenna, particularly our compass reading. Make sure that you have djusted the reading by the proper magnetic eviation. If you have been unable to find out hat the deviation for your area is, refer to "In- talling Your System" and follow the procedure or sighting on the North Star. When you are ure your antenna is aligned with true north, try gain to find a satellite.

OPTIMISING THE ANTENNA POSITION

The first rule for optimising (finding the best icture) is to make only one adjustment at a time o that each adjustment can be assessed for icture improvement. It is no good to adjust only ie antenna position while someone is adjusting olarity or flipping the receiver from channel to hannel. This technique is not conducive to idging the picture quality. I always start by get- ng the L.N.A. polarity adjusted. Set the receiver to a strong signal and then leave it alone. If your L.N.A. has a rotator, simply move its control until you have found the best picture or signal. With any luck, you should now have a good quality picture and can go on to check the satellite's other transponders . If the antenna is aimed at a dual polarity satellite like Satcom F-IIIR, rotate the L.N.A. 90 degrees and check the other polarity. Next, I adjust the antenna for the best picture. If your antenna has a handcrank, turn it until the picture disappears. Now, slowly turn the handcrank back until the picture reappears; note how many turns you are making. Keep turning in this direction until the picture disappears again. If the crank has been turned three times between the two points where the picture disappears, it is a safe bet that the best adjustment will be right in the middle. Turn the crank back halfway between the two extremes. If you have a polar mount, this is all the aiming adjustment you should do for the moment. If you have an Az-El mount, follow this procedure first for the elevation.

If your antenna has a motor drive, you can do this same sort of tweaking. Just note how much drive time expires between the points where the picture disappears. Cut the drive time in half to find the mid-point. It would be wise to repeat this procedure a couple of times until you are sure that the antenna is aimed properly. Take out your felt tipped pen and mark the antenna position by some reference method best suited to your antenna. It is always good to have this reference point so that if you move the antenna, you can get back to the original position.

It is a good idea to peak the focal length, at this point. The manufacturer should have supplied you with the exact distance from the feedhorn to the reflector, but production tolerances may have changed the distance somewhat. Different feedhorns usually require different focal length adjustments. Loosen the L.N.A./feedhorn bracket and slowly move the L.N.A. in and out while watching the screen. Mark the position when you have found the best picture and retighten everything.

Loosen the L.N.A./feedhorn bracket and slowly move the L.N.A. in and out while watching the screen. Mark the position when you have found the best picture and retighten everything.

By this time, it may be difficult to make effective adjustments, since there will be few discernible changes in picture quality. It will help to tune to a set of color bars transmitted by the satellite and make your adjustments using these as a reference. The color bars are often transmitted at half power, therefore the signal is much weaker. Any fine tuning adjustments you make to a weak signal will be more noticable than those made to a strong signal.

Continue making the fine adjustments as long as you keep getting results. Always mark your adjustment positions for reference.

SCANNING FOR MORE SATELLITES

When you start looking for another satellite, change both the elevation and the azimuth to the new coordinates. Using an inclinometer, simply turn the elevation adjustment to the new level. If you do a rough calculation of how many degrees east or west of the position at which you are now aimed is from the new satellite heading, you can usually guess how much to rotate the antenna without going to the trouble to haul out your compass. Just scan around with the azimuth control until you find the picture. Always mark the position of each satellite you find right on the mount so future search time will be cut to a minimum.

ADJUSTING POLAR MOUNT TRACKING

The polar mount is intended to accurately track the satellites. The best way is to start scanning the satellites from the lowest to the highest. If you are receiving good pictures from all the birds, everything is well adjusted and should be left as is.

If you find that the mount is tracking accurately at both ends of the satellite band but the middle satellites are not coming in as well as you would expect, your problem is with the offset adjustment. You should recheck the offset angle calculations and readjust.

If your mount is tracking accurately at one end of the belt and then becomes increasingly maladjusted as you move to the other end, the problem is in the aiming of the polar axis. The easiest way to correct this is to line up the axis with the North Star. If you cannot locate the North Star, you will have to adjust the axis by optimising the picture at both ends of the belt.

The three point polar mount is very stable, but more difficult to align than the single pole since any adjustments made to any leg will affect the position of the polar axis. Moving the polar axis upwards usually requires adjustment of all three legs. Single pole mounts generally have completely separate adjustments for the elevation and azimuth of the polar axis. Remember that the elevation of the polar axis must be identical to the latitude of your antenna, such as a polar pipe, place your inclinometer on it to verify the position. You can substitute a wire running between the two pivoting points where the antenna joins the mount. Be careful not to deflect the wire with the inclinometer.

If you have verified that the elevation of your axis is correct and that the antenna is still not tracking properly at one end of the band, the problem is your polar axis; it is not aimed at true north. After you optimise your picture on the lowest satellite by adjusting the reflector rotation check the elevation of the antenna itself. If it is higher than the expected elevation for that satellite, rotate the base counterclockwise; if it is lower, rotate clockwise. This trick will help you solve the problem if your compass is not doing the job and you do not want to wait until you can see the North Star.

Always trust your inclinometer reading over your compass reading. A final check of the elevation adjustment of your polar axis and your offset angle can be made by rotating your dish so that it is at the highest possible elevation. Measure the look angle with an inclinometer. The angle should be equal to your latitude plus the offset angle.

Once you have your polar mount tracking properly, it is the most enjoyable mount to use and the most troublefree because it has so few moving parts.

Your antenna should now be in perfect adjustment.

TUNING YOUR RECEIVER

Most receivers come factory tuned for optimum performance and they should be adjusted only with the proper test equipment and by a trained technician. However, you can adjust certain controls yourself and improve the picture. Some receivers have built-in modulators whose output levels can be adjusted for best picture. A good rule to follow is that if the adjustment pot is at the back of the receiver, you can adjust it yourself. You should not open the receiver and start tinkering with a screwdriver! You could end up with a dead receiver which has to go back to the manufacturer for repairs, or you could end up dead yourself! Read your owner's manual carefully: it will tell you what you should and should not touch.

Once your system is installed, there are ways to improve it. If you borrow other feedhorns, you can try them on your antenna and see if any of them improves your reception.

If you are in an area with microwave interference, read the article entitled "Terrestial Interference" for hints on improving your situation.

You can borrow your friends' receivers or ask dealers to demonstrate their products at your installation to see if they actually improve your reception. Try lower noise L.N.A.s to see if the picture improvement will justify the added cost.

High quality satellite television is a combination of proper equipment, installation, and fine tuning. When all these factors are in harmony, your system will deliver the enjoyment you expect.

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

These charts take the guess work out of finding the coordinates for Satcom IIIR. Check a map to find your latitude and longitude, then look at the top of the charts until you come to the pair with your longitude. Read down from your longitude until find your latitude directly to the left. These 2 figures on the chart are the azimuth and elevation when viewed from your location.

Site Latitude	Site Longitude 120	121	122	123	124	125	126	127	128	129	130	131	
35	198.7	197.1	195.4	193.8	192.1	190.4	188.7	187.0	185.2	183.5	181.7	180.0	AZ
	47.7	48.0	48.2	48.4	48.7	48.8	49.0	49.1	49.2	49.3	49.3	49.3	EL
36	198.3	196.7	195.1	193.4	191.8	190.1	188.5	186.8	185.1	183.4	181.7	180.0	
	46.6	46.9	47.1	47.4	47.6	47.7	47.9	48.0	48.1	48.2	48.2	48.2	
37	197.9	196.3	194.7	193.1	191.5	189.9	188.3	186.6	185.0	183.3	181.7	180.0	
	45.5	45.8	46.0	46.3	46.5	46.6	46.8	46.9	47.0	47.0	47.1	47.1	
38	197.5	196.0	194.4	192.9	191.3	189.7	188.1	186.5	184.9	183.2	181.6	180.0	
	44.5	44.7	45.0	45.2	45.4	45.5	45.6	45.8	45.8	45.9	45.9	46.0	
39	197.2	195.7	194.1	192.6	191.0	189.5	187.9	186.3	184.8	183.2	181.6	180.0	
	43.4	43.6	43.9	44.1	44.3	44.4	44.5	44.6	44.7	44.8	44.8	44.8	
40	196.8	195.3	193.8	192.3	190.8	189.3	187.8	186.2	184.7	183.1	181.6	180.0	AZ
	42.3	42.6	42.8	43.0	43.2	43.3	43.4	43.5	43.6	43.7	43.7	43.7	EL
41	196.5	195.0	193.6	192.1	190.6	189.1	187.6	186.1	184.6	183.0	181.5	180.0	
	41.3	41.5	41.7	41.9	42.1	42.2	42.3	42.4	42.5	42.6	42.6	42.6	
42	196.2	194.8	193.3	191.9	190.4	188.9	187.4	186.0	184.5	183.0	181.5	180.0	
	40.2	40.4	40.6	40.8	41.0	41.1	41.2	41.3	41.4	41.4	41.5	41.5	
43	195.9	194.5	193.1	191.6	190.2	188.8	187.3	185.9	184.4	182.9	181.5	180.0	
	39.1	39.4	39.5	39.7	39.9	40.0	40.1	40.2	40.3	40.3	40.4	40.4	
44	195.6	194.2	192.8	191.4	190.0	188.6	187.2	185.7	184.3	182.9	181.4	180.0	
	38.1	38.3	38.5	38.6	38.8	38.9	39.0	39.1	39.2	39.2	39.3	39.3	
45	195.4	194.0	192.6	191.2	189.9	188.5	187.1	185.6	184.2	182.8	181.4	180.0	AZ
	37.0	37.2	37.4	37.6	37.7	37.8	37.9	38.0	38.1	38.1	38.2	38.2	EL
46	195.1	193.8	192.4	191.1	189.7	188.3	186.9	185.6	184.2	182.8	181.4	180.0	
	36.0	36.1	36.3	36.5	36.6	36.7	36.8	36.9	37.0	37.0	37.1	37.1	
47	194.9	193.6	192.2	190.9	189.5	188.2	186.8	185.5	184.1	182.7	181.4	180.0	
	34.9	35.1	35.2	35.4	35.5	35.6	35.7	35.8	35.9	35.9	36.0	36.0	
48	194.7	193.3	192.0	190.7	189.4	188.1	186.7	185.4	184.0	182.7	181.3	180.0	
	33.8	34.0	34.2	34.3	34.4	34.6	34.7	34.7	34.8	34.8	34.9	34.9	
49	194.4	193.2	191.9	190.5	189.2	187.9	186.6	185.3	184.0	182.6	181.3	180.0	
	32.8	33.0	33.1	33.2	33.4	33.5	33.6	33.6	33.7	33.7	33.8	33.8	
50	194.2	193.0	191.7	190.4	189.1	187.8	186.5	185.2	183.9	182.6	181.3	180.0	AZ
	31.7	31.9	32.0	32.2	32.3	32.4	32.5	32.6	32.6	32.6	32.7	32.7	EL
51	194.0	192.8	191.5	190.3	189.0	187.7	186.4	185.1	183.9	182.6	181.3	180.0	
	30.7	30.8	31.0	31.1	31.2	31.3	31.4	31.5	31.5	31.6	31.6	31.6	
52	193.9	192.6	191.4	190.1	188.9	187.6	186.3	185.1	183.8	182.5	181.3	180.0	
	29.6	29.8	29.9	30.0	30.1	30.2	30.3	30.4	30.4	30.5	30.5	30.5	
53	193.7	192.5	191.2	190.0	188.7	187.5	186.3	185.0	183.8	182.5	181.3	180.0	
	28.6	28.7	28.9	29.0	29.1	29.2	29.2	29.3	29.4	29.4	29.4	29.4	
54	193.5	192.3	191.1	189.9	188.6	187.4	186.2	184.9	183.7	182.5	181.2	180.0	
	27.5	27.7	27.8	27.9	28.0	28.1	28.2	28.2	28.3	28.3	28.3	28.3	
55	193.3	192.1	190.9	189.7	188.5	187.3	186.1	184.9	183.7	182.4	181.2	180.0	AZ
	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.2	27.2	27.3	27.3	EL
56	193.2	192.0	190.8	189.6	188.4	187.2	186.0	184.8	183.6	182.4	181.2	180.0	
	25.4	25.6	25.7	25.8	25.9	26.0	26.0	26.1	26.1	26.2	26.2	26.2	
57	193.0	191.9	190.7	189.5	188.3	187.1	186.0	184.8	183.6	182.4	181.2	180.0	
	24.4	24.5	24.6	24.7	24.8	24.9	25.0	25.0	25.1	25.1	25.1	25.1	
58	192.9	191.7	190.6	189.4	188.2	187.1	185.9	184.7	183.5	182.4	181.2	180.0	
	23.4	23.5	23.6	23.7	23.8	23.8	23.9	24.0	24.0	24.0	24.0	24.1	
59	192.8	191.6	190.5	189.3	188.2	187.0	185.8	184.7	183.5	182.3	181.2	180.0	
	22.3	22.4	22.5	22.6	22.7	22.8	22.9	22.9	22.9	23.0	23.0	23.0	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Longitude

Site Latitude	60	61	62	63	64	65	66	67	68	69	70	71	
10	266.6	266.4	266.2	266.0	265.8	265.6	265.4	265.2	264.9	264.7	264.5	264.3	AZ
	10.1	11.1	12.2	13.2	14.2	15.2	16.2	17.3	18.3	19.3	20.4	21.4	EL
11	266.2	266.0	265.8	265.6	265.4	265.1	264.9	264.7	264.4	264.2	264.0	263.7	
	10.1	11.1	12.1	13.1	14.1	15.1	16.2	17.2	18.2	19.2	20.3	21.3	
12	265.9	265.7	265.4	265.2	265.0	264.7	264.5	264.2	264.0	263.7	263.4	263.2	
	10.0	11.0	12.0	13.0	14.0	15.0	16.1	17.1	18.1	19.1	20.1	21.2	
13	265.6	265.3	265.1	264.8	264.5	264.3	264.0	263.7	263.5	263.2	262.9	262.6	
	9.9	10.9	11.9	12.9	13.9	14.9	15.9	17.0	18.0	19.0	20.0	21.0	
14	265.2	265.0	264.7	264.4	264.1	263.9	263.6	263.3	263.0	262.7	262.4	262.0	
	9.8	10.8	11.8	12.8	13.8	14.8	15.8	16.8	17.9	18.9	19.9	20.9	
15	264.9	264.6	264.3	264.0	263.7	263.4	263.1	262.8	262.5	262.2	261.8	261.5	AZ
	9.7	10.7	11.7	12.7	13.7	14.7	15.7	16.7	17.7	18.7	19.7	20.7	EL
16	264.6	264.3	264.0	263.6	263.3	263.0	262.7	262.3	262.0	261.7	261.3	261.0	
	9.7	10.6	11.6	12.6	13.6	14.6	15.6	16.6	17.6	18.6	19.6	20.6	
17	264.3	263.9	263.6	263.3	262.9	262.6	262.2	261.9	261.5	261.2	260.8	260.4	
	9.6	10.5	11.5	12.5	13.5	14.5	15.4	16.4	17.4	18.4	19.4	20.4	
18	263.9	263.6	263.2	262.9	262.5	262.2	261.8	261.4	261.1	260.7	260.3	259.9	
	9.5	10.4	11.4	12.4	13.3	14.3	15.3	16.3	17.3	18.3	19.2	20.2	
19	263.6	263.2	262.9	262.5	262.1	261.8	261.4	261.0	260.6	260.2	259.8	259.4	
	9.3	10.3	11.3	12.2	13.2	14.2	15.2	16.1	17.1	18.1	19.1	20.0	
20	263.3	262.9	262.5	262.1	261.7	261.3	260.9	260.5	260.1	259.7	259.3	258.8	AZ
	9.2	10.2	11.1	12.1	13.1	14.0	15.0	16.0	16.9	17.9	18.9	19.8	EL
21	263.0	262.6	262.2	261.8	261.4	260.9	260.5	260.1	259.7	259.2	258.8	258.3	
	9.1	10.0	11.0	12.0	12.9	13.9	14.8	15.8	16.7	17.7	18.7	19.6	
22	262.7	262.2	261.8	261.4	261.0	260.5	260.1	259.6	259.2	258.7	258.3	257.8	
	9.0	9.9	10.9	11.8	12.8	13.7	14.6	15.6	16.6	17.5	18.5	19.4	
23	262.3	261.9	261.5	261.0	260.6	260.1	259.7	259.2	258.7	258.3	257.8	257.3	
	8.8	9.8	10.7	11.6	12.6	13.5	14.5	15.4	16.4	17.3	18.2	19.2	
24	262.0	261.6	261.1	260.7	260.2	259.7	259.3	258.8	258.3	257.8	257.3	256.8	
	8.7	9.6	10.6	11.5	12.4	13.3	14.3	15.2	16.1	17.1	18.0	18.9	
25	261.7	261.3	260.8	260.3	259.8	259.3	258.9	258.4	257.8	257.3	256.8	256.3	AZ
	8.6	9.5	10.4	11.3	12.2	13.2	14.1	15.0	15.9	16.9	17.8	18.7	EL
26	261.4	260.9	260.4	260.0	259.5	259.0	258.4	257.9	257.4	256.9	256.3	255.8	
	8.4	9.3	10.2	11.1	12.0	13.0	13.9	14.8	15.7	16.6	17.5	18.4	
27	261.1	260.6	260.1	259.6	259.1	258.6	258.0	257.5	257.0	256.4	255.9	255.3	
	8.2	9.1	10.0	11.0	11.9	12.8	13.7	14.6	15.5	16.4	17.3	18.2	
28	260.8	260.3	259.8	259.3	258.7	258.2	257.7	257.1	256.5	256.0	255.4	254.8	
	8.1	9.0	9.9	10.8	11.7	12.6	13.4	14.3	15:2	16.1	17.0	17.9	
29	260.5	260.0	259.5	258.9	258.4	257.8	257.3	256.7	256.1	255.5	255.0	254.4	
	7.9	8.8	9.7	10.6	11.5	12.3	13.2	14.1	15.0	15.9	16.8	17.6	
30	260.2	259.7	259.1	258.6	258.0	257.4	256.9	256.3	255.7	255.1	254.5	253.9	AZ
	7.8	8.6	9.5	10.4	11.2	12.1	13.0	13.9	14.7	15.6	16.5	17.4	EL
31	259.9	259.4	258.8	258.2	257.7	257.1	256.5	255.9	255.3	254.7	254.1	253.4	
	7.6	8.4	9.3	10.2	11.0	11.9	12.7	13.6	14.5	15.3	16.2	17.1	
32	259.7	259.1	258.5	257.9	257.3	256.7	256.1	255.5	254.9	254.3	253.6	253.0	
	7.4	8.2	9.1	9.9	10.8	11.7	12.5	13.4	14.2	15.1	15.9	16.8	
33	259.4	258.8	258.2	257.6	257.0	256.4	255.7	255.1	254.5	253.8	253.2	252.5	
	7.2	8.0	8.9	9.7	10.6	11.4	12.3	13.1	13.9	14.8	15.6	16.4	
34	259.1	258.5	257.9	257.3	256.6	256.0	255.4	254.7	254.1	253.4	252.8	252.1	
	7.0	7.8	8.7	9.5	10.3	11.2	12.0	12.8	13.7	14.5	15.3	16.1	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Latitude	Site Longitude 60	61	62	63	64	65	66	67	68	69	70	71	
35	258.8	258.2	257.6	257.0	256.3	255.7	255.0	254.4	253.7	253.0	252.4	251.7	AZ
	6.8	7.6	8.5	9.3	10.1	10.9	11.7	12.5	13.4	14.2	15.0	15.8	EL
36	258.6	257.9	257.3	256.6	256.0	255.3	254.7	254.0	253.3	252.6	252.0	251.3	
	6.6	7.4	8.2	9.0	9.9	10.7	11.5	12.3	13.1	13.9	14.7	15.5	
37	258.3	257.6	257.0	256.3	255.7	255.0	254.3	253.6	253.0	252.3	251.6	250.8	
	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8	13.6	14.3	15.1	
38	258.0	257.4	256.7	256.0	255.4	254.7	254.0	253.3	252.6	251.9	251.2	250.4	
	6.2	7.0	7.8	8.6	9.3	10.1	10.9	11.7	12.5	13.2	14.0	14.8	
39	257.8	257.1	256.4	255.7	255.0	254.3	253.6	252.9	252.2	251.5	250.8	250.0	
	6.0	6.8	7.5	8.3	9.1	9.9	10.6	11.4	12.2	12.9	13.7	14.4	
40	257.5	256.8	256.1	255.4	254.7	254.0	253.3	252.6	251.9	251.1	250.4	249.6	AZ
	5.8	6.5	7.3	8.1	8.8	9.6	10.3	11.1	11.8	12.6	13.3	14.1	EL
41	257.3	256.6	255.9	255.2	254.4	253.7	253.0	252.3	251.5	250.8	250.0	249.3	
	5.6	6.3	7.1	7.8	8.5	9.3	10.0	10.8	11.5	12.2	13.0	13.7	
42	257.0	256.3	255.6	254.9	254.1	253.4	252.7	251.9	251.2	250.4	249.6	248.9	
	5.3	6.1	6.8	7.5	8.3	9.0	9.7	10.5	11.2	11.9	12.6	13.3	
43	256.8	256.1	255.3	254.6	253.9	253.1	252.4	251.6	250.8	250.1	249.3	248.5	
	5.1	5.8	6.5	7.3	8.0	8.7	9.4	10.1	10.8	11.6	12.3	13.0	
44	256.5	255.8	255.1	254.3	253.6	252.8	252.1	251.3	250.5	249.7	248.9	248.1	
	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	11.2	11.9	12.6	
45	256.3	255.6	254.8	254.1	253.3	252.5	251.8	251.0	250.2	249.4	248.6	247.8	AZ
	4.6	5.3	6.0	6.7	7.4	8.1	8.8	9.5	10.2	10.8	11.5	12.2	EL
46	256.1	255.3	254.6	253.8	253.0	252.2	251.5	250.7	249.9	249.1	248.3	247.4	
	4.4	5.1	5.8	6.4	7.1	7.8	8.5	9.1	9.8	10.5	11.1	11.8	
47	255.9	255.1	254.3	253.5	252.8	252.0	251.2	250.4	249.6	248.8	247.9	247.1	
	4.1	4.8	5.5	6.1	6.8	7.5	8.1	8.8	9.4	10.1	10.8	11.4	
48	255.6	254.9	254.1	253.3	252.5	251.7	250.9	250.1	249.3	248.4	247.6	246.8	
	3.9	4.6	5.2	5.9	6.5	7.2	7.8	8.4	9.1	9.7	10.4	11.0	
49	255.4	254.6	253.8	253.0	252.2	251.4	250.6	249.8	249.0	248.1	247.3	246.5	
	3.6	4.3	4.9	5.6	6.2	6.8	7.5	8.1	8.7	9.3	10.0	10.6	
50	255.2	254.4	253.6	252.8	252.0	251.2	250.3	249.5	248.7	247.8	247.0	246.1	AZ
	3.4	4.0	4.6	5.3	5.9	6.5	7.1	7.7	8.4	9.0	9.6	10.2	EL
51	255.0	254.2	253.4	252.6	251.7	250.9	250.1	249.2	248.4	247.5	246.7	245.8	
	3.1	3.7	4.4	5.0	5.6	6.2	6.8	7.4	8.0	8.6	9.2	9.8	
52	254.8	254.0	253.2	252.3	251.5	250.7	249.8	249.0	248.1	247.3	246.4	245.5	
	2.9	3.5	4.1	4.7	5.3	5.8	6.4	7.0	7.6	8.2	8.8	9.3	
53	254.6	253.8	253.0	252.1	251.3	250.4	249.6	248.7	247.9	247.0	246.1	245.2	
	2.6	3.2	3.8	4.3	4.9	5.5	6.1	6.6	7.2	7.8	8.4	8.9	
54	254.4	253.6	252.7	251.9	251.0	250.2	249.3	248.5	247.6	246.7	245.8	245.0	
	2.3	2.9	3.5	4.0	4.6	5.2	5.7	6.3	6.8	7.4	7.9	8.5	
55	254.2	253.4	252.5	251.7	250.8	250.0	249.1	248.2	247.3	246.5	245.6	244.7	AZ
	2.1	2.6	3.2	3.7	4.3	4.8	5.4	5.9	6.4	7.0	7.5	8.0	EL
56	254.1	253.2	252.3	251.5	250.6	249.7	248.9	248.0	247.1	246.2	245.3	244.4	
	1.8	2.3	2.9	3.4	3.9	4.5	5.0	5.5	6.0	6.6	7.1	7.6	
57	253.9	253.0	252.2	251.3	250.4	249.5	248.6	247.8	246.9	246.0	245.1	244.2	
	1.5	2.0	2.6	3.1	3.6	4.1	4.6	5.1	5.7	6.2	6.7	7.2	
58	253.7	252.8	252.0	251.1	250.2	249.3	248.4	247.5	246.6	245.7	244.8	243.9	
	1.2	1.7	2.2	2.8	3.3	3.8	4.3	4.8	5.3	5.7	6.2	6.7	
59	253.6	252.7	251.8	250.9	250.0	249.1	248.2	247.3	246.4	245.5	244.6	243.7	
	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.8	5.3	5.8	6.3	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Longitude

Site Latitude	72	73	74	75	76	77	78	79	80	81	82	83	
10	264.0	263.8	263.6	263.3	263.1	262.8	262.5	262.3	262.0	261.7	261.4	261.1	AZ
	22.4	23.5	24.5	25.6	26.6	27.7	28.7	29.8	30.8	31.9	33.0	34.0	EL
11	263.5	263.2	262.9	262.7	262.4	262.1	261.8	261.5	261.2	260.9	260.6	260.3	
	22.3	23.4	24.4	25.4	26.5	27.5	28.6	29.6	30.7	31.7	32.8	33.8	
12	262.9	262.6	262.3	262.0	261.7	261.4	261.1	260.8	260.4	260.1	259.8	259.4	
	22.2	23.2	24.3	25.3	26.3	27.4	28.4	29.5	30.5	31.5	32.6	33.6	
13	262.3	262.0	261.7	261.4	261.0	260.7	260.4	260.0	259.7	259.3	258.9	258.5	
	22.1	23.1	24.1	25.1	26.2	27.2	28.2	29.3	30.3	31.4	32.4	33.4	
14	261.7	261.4	261.1	260.7	260.4	260.0	259.7	259.3	258.9	258.5	258.1	257.7	
	21.9	22.9	24.0	25.0	26.0	27.0	28.1	29.1	30.1	31.1	32.2	33.2	
15	261.2	260.8	260.5	260.1	259.7	259.4	259.0	258.6	258.2	257.7	257.3	256.9	AZ
	21.8	22.8	23.8	24.8	25.8	26.8	27.9	28.9	29.9	30.9	31.9	33.0	EL
16	260.6	260.2	259.9	259.5	259.1	258.7	258.3	257.8	257.4	257.0	256.5	256.1	
	21.6	22.6	23.6	24.6	25.6	26.6	27.6	28.7	29.7	30.7	31.7	32.7	
17	260.0	259.6	259.2	258.8	258.4	258.0	257.6	257.1	256.7	256.2	255.7	255.3	
	21.4	22.4	23.4	24.4	25.4	26.4	27.4	28.4	29.4	30.4	31.4	32.4	
18	259.5	259.1	258.7	258.2	257.8	257.3	256.9	256.4	256.0	255.5	255.0	254.5	
	21.2	22.2	23.2	24.2	25.2	26.2	27.2	28.2	29.2	30.2	31.2	32.2	
19	258.9	258.5	258.1	257.6	257.2	256.7	256.2	255.7	255.2	254.7	254.2	253.7	
	21.0	22.0	23.0	24.0	25.0	25.9	26.9	27.9	28.9	29.9	30.9	31.9	
20	258.4	257.9	257.5	257.0	256.5	256.0	255.5	255.0	254.5	254.0	253.4	252.9	AZ
	20.8	21.8	22.8	23.7	24.7	25.7	26.7	27.6	28.6	29.6	30.6	31.5	EL
21	257.8	257.4	256.9	256.4	255.9	255.4	254.9	254.4	253.8	253.3	252.7	252.1	
	20.6	21.6	22.5	23.5	24.5	25.4	26.4	27.4	28.3	29.3	30.3	31.2	
22	257.3	256.8	256.3	255.8	255.3	254.8	254.2	253.7	253.1	252.6	252.0	251.4	
	20.4	21.3	22.3	23.2	24.2	25.1	26.1	27.1	28.0	29.0	29.9	30.9	
23	256.8	256.3	255.8	255.2	254.7	254.2	253.6	253.0	252.4	251.8	251.2	250.6	
	20.1	21.1	22.0	23.0	23.9	24.9	25.8	26.8	27.7	28.6	29.6	30.5	
24	256.3	255.7	255.2	254.7	254.1	253.5	253.0	252.4	251.8	251.2	250.5	249.9	
	19.9	20.8	21.8	22.7	23.6	24.6	25.5	26.4	27.4	28.3	29.2	30.2	
25	255.8	255.2	254.7	254.1	253.5	252.9	252.3	251.7	251.1	250.5	249.8	249.2	AZ
	19.6	20.6	21.5	22.4	23.3	24.3	25.2	26.1	27.0	27.9	28.9	29.8	EL
26	255.2	254.7	254.1	253.5	252.9	252.3	251.7	251.1	250.5	249.8	249.1	248.5	
	19.4	20.3	21.2	22.1	23.0	23.9	24.9	25.8	26.7	27.6	28.5	29.4	
27	254.7	254.2	253.6	253.0	252.4	251.7	251.1	250.5	249.8	249.1	248.5	247.8	
	19.1	20.0	20.9	21.8	22.7	23.6	24.5	25.4	26.3	27.2	28.1	29.0	
28	254.2	253.7	253.0	252.4	251.8	251.2	250.5	249.9	249.2	248.5	247.8	247.1	
	18.8	19.7	20.6	21.5	22.4	23.3	24.2	25.0	25.9	26.8	27.7	28.6	
29	253.8	253.1	252.5	251.9	251.2	250.6	249.9	249.3	248.6	247.9	247.1	246.4	
	18.5	19.4	20.3	21.2	22.0	22.9	23.8	24.7	25.5	26.4	27.3	28.2	
30	253.3	252.6	252.0	251.4	250.7	250.0	249.4	248.7	248.0	247.2	246.5	245.8	AZ
	18.2	19.1	20.0	20.8	21.7	22.6	23.4	24.3	25.2	26.0	26.9	27.7	EL
31	252.8	252.2	251.5	250.8	250.2	249.5	248.8	248.1	247.4	246.6	245.9	245.1	
	17.9	18.8	19.6	20.5	21.3	22.2	23.0	23.9	24.7	25.6	26.4	27.3	
32	252.3	251.7	251.0	250.3	249.6	248.9	248.2	247.5	246.8	246.0	245.3	244.5	
	17.6	18.4	19.3	20.1	21.0	21.8	22.7	23.5	24.3	25.2	26.0	26.8	
33	251.9	251.2	250.5	249.8	249.1	248.4	247.7	246.9	246.2	245.4	244.7	243.9	
	17.3	18.1	18.9	19.8	20.6	21.4	22.3	23.1	23.9	24.7	25.5	26.3	
34	251.4	250.7	250.0	249.3	248.6	247.9	247.2	246.4	245.6	244.9	244.1	243.3	
	17.0	17.8	18.6	19.4	20.2	21.0	21.9	22.7	23.5	24.3	25.1	25.9	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Longitude

Site Latitude	72	73	74	75	76	77	78	79	80	81	82	83	
35	251.0	250.3	249.6	248.8	248.1	247.4	246.6	245.9	245.1	244.3	243.5	242.7	AZ
	16.6	17.4	18.2	19.0	19.8	20.6	21.4	22.2	23.0	23.8	24.6	25.4	EL
36	250.5	249.8	249.1	248.4	247.6	246.9	246.1	245.3	244.5	243.7	242.9	242.1	
	16.3	17.1	17.9	18.7	19.4	20.2	21.0	21.8	22.6	23.3	24.1	24.9	
37	250.1	249.4	248.7	247.9	247.1	246.4	245.6	244.8	244.0	243.2	242.4	241.5	
	15.9	16.7	17.5	18.3	19.0	19.8	20.6	21.3	22.1	22.9	23.6	24.4	
38	249.7	249.0	248.2	247.4	246.7	245.9	245.1	244.3	243.5	242.7	241.8	241.0	
	15.6	16.3	17.1	17.9	18.6	19.4	20.1	20.9	21.6	22.4	23.1	23.9	
39	249.3	248.5	247.8	247.0	246.2	245.4	244.6	243.8	243.0	242.2	241.3	240.5	
	15.2	16.0	16.7	17.5	18.2	18.9	19.7	20.4	21.2	21.9	22.6	23.3	
40	248.9	248.1	247.3	246.6	245.8	245.0	244.2	243.3	242.5	241.7	240.8	239.9	AZ
	14.8	15.6	16.3	17.0	17.8	18.5	19.2	20.0	20.7	21.4	22.1	22.8	EL
41	248.5	247.7	246.9	246.1	245.3	244.5	243.7	242.9	242.0	241.2	240.3	239.4	
	14.4	15.2	15.9	16.6	17.3	18.1	18.8	19.5	20.2	20.9	21.6	22.3	
42	248.1	247.3	246.5	245.7	244.9	244.1	243.2	242.4	241.5	240.7	239.8	238.9	
	14.1	14.8	15.5	16.2	16.9	17.6	18.3	19.0	19.7	20.4	21.1	21.7	
43	247.7	246.9	246.1	245.3	244.5	243.6	242.8	241.9	241.1	240.2	239.3	238.4	
	13.7	14.4	15.1	15.8	16.5	17.1	17.8	18.5	19.2	19.9	20.5	21.2	
44	247.3	246.5	245.7	244.9	244.1	243.2	242.4	241.5	240.6	239.8	238.9	238.0	
	13.3	14.0	14.6	15.3	16.0	16.7	17.3	18.0	18.7	19.3	20.0	20.6	
45	247.0	246.2	245.3	244.5	243.7	242.8	241.9	241.1	240.2	239.3	238.4	237.5	AZ
	12.9	13.5	14.2	14.9	15.5	16.2	16.9	17.5	18.2	18.8	19.4	20.1	EL
46	246.6	245.8	245.0	244.1	243.3	242.4	241.5	240.7	239.8	238.9	238.0	237.1	
	12.5	13.1	13.8	14.4	15.1	15.7	16.4	17.0	17.6	18.3	18.9	19.5	
47	246.3	245.4	244.6	243.7	242.9	242.0	241.1	240.3	239.4	238.5	237.6	236.6	
	12.1	12.7	13.3	14.0	14.6	15.2	15.9	16.5	17.1	17.7	18.3	18.9	
48	245.9	245.1	244.2	243.4	242.5	241.6	240.8	239.9	239.0	238.1	237.1	236.2	
	11.6	12.3	12.9	13.5	14.1	14.7	15.4	16.0	16.6	17.2	17.8	18.3	
49	245.6	244.8	243.9	243.0	242.1	241.3	240.4	239.5	238.6	237.7	236.7	235.8	
	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.4	16.0	16.6	17.2	17.8	
50	245.3	244.4	243.6	242.7	241.8	240.9	240.0	239.1	238.2	237.3	236.3	235.4	AZ
	10.8	11.4	12.0	12.6	13.2	13.7	14.3	14.9	15.5	16.0	16.6	17.2	EL
51	245.0	244.1	243.2	242.3	241.4	240.5	239.6	238.7	237.8	236.9	236.0	235.0	
	10.3	10.9	11.5	12.1	12.7	13.2	13.8	14.4	14.9	15.5	16.0	16.6	
52	244.7	243.8	242.9	242.0	241.1	240.2	239.3	238.4	237.5	236.5	235.6	234.6	
	9.9	10.5	11.0	11.6	12.2	12.7	13.3	13.8	14.4	14.9	15.4	16.0	
53	244.4	243.5	242.6	241.7	240.8	239.9	239.0	238.0	237.1	236.2	235.2	234.3	
	9.5	10.0	10.6	11.1	11.7	12.2	12.7	13.3	13.8	14.3	14.8	15.4	
54	244.1	243.2	242.3	241.4	240.5	239.6	238.6	237.7	236.8	235.8	234.9	233.9	
	9.0	9.6	10.1	10.6	11.2	11.7	12.2	12.7	13.2	13.7	14.2	14.7	
55	243.8	242.9	242.0	241.1	240.2	239.2	238.3	237.4	236.4	235.5	234.5	233.6	AZ
	8.6	9.1	9.6	10.1	10.7	11.2	11.7	12.2	12.7	13.2	13.6	14.1	EL
56	243.5	242.6	241.7	240.8	239.9	238.9	238.0	237.1	236.1	235.2	234.2	233.3	
	8.1	8.6	9.1	9.6	10.1	10.6	11.1	11.6	12.1	12.6	13.0	13.5	
57	243.3	242.3	241.4	240.5	239.6	238.6	237.7	236.8	235.8	234.9	233.9	232.9	
	7.7	8.2	8.6	9.1	9.6	10.1	10.6	11.0	11.5	12.0	12.4	12.9	
58	243.0	242.1	241.2	240.2	239.3	238.4	237.4	236.5	235.5	234.6	233.6	232.6	
	7.2	7.7	8.2	8.6	9.1	9.6	10.0	10.5	10.9	11.4	11.8	12.3	
59	242.7	241.8	240.9	240.0	239.0	238.1	237.1	236.2	235.2	234.3	233.3	232.3	
	6.7	7.2	7.7	8.1	8.6	9.0	9.5	9.9	10.3	10.8	11.2	11.6	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Latitude	Site Longitude 84	85	86	87	88	89	90	91	92	93	94	95	
10	260.8	260.5	260.1	259.8	259.5	259.1	258.7	258.3	257.9	257.5	257.0	256.6	AZ
	35.1	36.1	37.2	38.3	39.4	40.4	41.5	42.6	43.6	44.7	45.8	46.9	EL
11	259.9	259.6	259.2	258.8	258.4	258.0	257.6	257.2	256.7	256.3	255.8	255.3	
	34.9	36.0	37.0	38.1	39.1	40.2	41.3	42.3	43.4	44.5	45.5	46.6	
12	259.0	258.6	258.3	257.8	257.4	257.0	256.5	256.1	255.6	255.1	254.6	254.0	
	34.7	35.7	36.8	37.9	38.9	40.0	41.0	42.1	43.1	44.2	45.3	46.3	
13	258.2	257.7	257.3	256.9	256.4	256.0	255.5	255.0	254.5	253.9	253.4	252.8	
	34.5	35.5	36.6	37.6	38.7	39.7	40.8	41.8	42.8	43.9	44.9	46.0	
14	257.3	256.9	256.4	255.9	255.5	255.0	254.4	253.9	253.4	252.8	252.2	251.6	
	34.2	35.3	36.3	37.4	38.4	39.4	40.5	41.5	42.5	43.6	44.6	45.6	
15	256.4	256.0	255.5	255.0	254.5	254.0	253.4	252.9	252.3	251.7	251.0	250.4	AZ
	34.0	35.0	36.1	37.1	38.1	39.1	40.2	41.2	42.2	43.2	44.3	45.3	EL
16	255.6	255.1	254.6	254.1	253.5	253.0	252.4	251.8	251.2	250.6	249.9	249.2	
	33.7	34.7	35.8	36.8	37.8	38.8	39.8	40.8	41.9	42.9	43.9	44.9	
17	254.7	254.2	253.7	253.2	252.6	252.0	251.4	250.8	250.1	249.5	248.8	248.1	
	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	
18	253.9	253.4	252.8	252.3	251.7	251.1	250.4	249.8	249.1	248.4	247.7	247.0	
	33.2	34.2	35.2	36.1	37.1	38.1	39.1	40.1	41.1	42.1	43.1	44.1	
19	253.1	252.5	252.0	251.4	250.8	250.1	249.5	248.8	248.1	247.4	246.6	245.9	
	32.8	33.8	34.8	35.8	36.8	37.8	38.7	39.7	40.7	41.7	42.6	43.6	
20	252.3	251.7	251.1	250.5	249.9	249.2	248.5	247.8	247.1	246.4	245.6	244.8	AZ
	32.5	33.5	34.5	35.4	36.4	37.4	38.4	39.3	40.3	41.2	42.2	43.1	EL
21	251.5	250.9	250.3	249.6	249.0	248.3	247.6	246.9	246.1	245.4	244.6	243.7	
	32.2	33.1	34.1	35.1	36.0	37.0	37.9	38.9	39.8	40.8	41.7	42.7	
22	250.7	250.1	249.5	248.8	248.1	247.4	246.7	245.9	245.2	244.4	243.6	242.7	
	31.8	32.8	33.7	34.7	35.6	36.6	37.5	38.4	39.4	40.3	41.2	42.2	
23	250.0	249.3	248.7	248.0	247.3	246.5	245.8	245.0	244.2	243.4	242.6	241.7	
	31.5	32.4	33.3	34.3	35.2	36.1	37.1	38.0	38.9	39.8	40.7	41.6	
24	249.2	248.6	247.9	247.2	246.4	245.7	244.9	244.1	243.3	242.5	241.6	240.8	
	31.1	32.0	32.9	33.9	34.8	35.7	36.6	37.5	38.4	39.3	40.2	41.1	
25	248.5	247.8	247.1	246.4	245.6	244.9	244.1	243.3	242.4	241.6	240.7	239.8	AZ
	30.7	31.6	32.5	33.4	34.3	35.2	36.1	37.0	37.9	38.8	39.7	40.6	EL
26	247.8	247.1	246.3	245.6	244.8	244.0	243.2	242.4	241.6	240.7	239.8	238.9	
	30.3	31.2	32.1	33.0	33.9	34.8	35.6	36.5	37.4	38.3	39.1	40.0	
27	247.1	246.3	245.6	244.8	244.0	243.2	242.4	241.6	240.7	239.8	238.9	238.0	
	29.9	30.8	31.6	32.5	33.4	34.3	35.1	36.0	36.9	37.7	38.6	39.4	
28	246.4	245.6	244.9	244.1	243.3	242.5	241.6	240.8	239.9	239.0	238.1	237.1	
	29.5	30.3	31.2	32.1	32.9	33.8	34.6	35.5	36.3	37.2	38.0	38.8	
29	245.7	244.9	244.1	243.3	242.5	241.7	240.9	240.0	239.1	238.2	237.2	236.3	
	29.0	29.9	30.7	31.6	32.4	33.3	34.1	34.9	35.8	36.6	37.4	38.2	
30	245.0	244.2	243.4	242.6	241.8	241.0	240.1	239.2	238.3	237.4	236.4	235.5	AZ
	28.6	29.4	30.2	31.1	31.9	32.7	33.6	34.4	35.2	36.0	36.8	37.6	EL
31	244.3	243.6	242.7	241.9	241.1	240.2	239.4	238.5	237.5	236.6	235.6	234.7	
	28.1	28.9	29.8	30.6	31.4	32.2	33.0	33.8	34.6	35.4	36.2	37.0	
32	243.7	242.9	242.1	241.2	240.4	239.5	238.6	237.7	236.8	235.9	234.9	233.9	
	27.6	28.4	29.3	30.1	30.9	31.7	32.5	33.2	34.0	34.8	35.6	36.3	
33	243.1	242.3	241.4	240.6	239.7	238.8	237.9	237.0	236.1	235.1	234.1	233.1	
	27.1	27.9	28.7	29.5	30.3	31.1	31.9	32.7	33.4	34.2	34.9	35.7	
34	242.5	241.6	240.8	239.9	239.1	238.2	237.2	236.3	235.4	234.4	233.4	232.4	
	26.7	27.4	28.2	29.0	29.8	30.5	31.3	32.1	32.8	33.5	34.3	35.0	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Longitude

Site Latitude	84	85	86	87	88	89	90	91	92	93	94	95	
35	241.9	241.0	240.2	239.3	238.4	237.5	236.6	235.6	234.7	233.7	232.7	231.7	AZ
	26.2	26.9	27.7	28.5	29.2	30.0	30.7	31.4	32.2	32.9	33.6	34.3	EL
36	241.3	240.4	239.6	238.7	237.8	236.9	235.9	235.0	234.0	233.0	232.0	231.0	
	25.6	26.4	27.2	27.9	28.6	29.4	30.1	30.8	31.5	32.3	33.0	33.6	
37	240.7	239.8	239.0	238.1	237.2	236.2	235.3	234.4	233.4	232.4	231.4	230.4	
	25.1	25.9	26.6	27.3	28.1	28.8	29.5	30.2	30.9	31.6	32.3	33.0	
38	240.1	239.3	238.4	237.5	236.6	235.6	234.7	233.7	232.8	231.8	230.8	229.7	
	24.6	25.3	26.0	26.8	27.5	28.2	28.9	29.6	30.3	30.9	31.6	32.3	
39	239.6	238.7	237.8	236.9	236.0	235.0	234.1	233.1	232.1	231.1	230.1	229.1	
	24.1	24.8	25.5	26.2	26.9	27.6	28.2	28.9	29.6	30.3	30.9	31.5	
40	239.1	238.2	237.3	236.4	235.4	234.5	233.5	232.5	231.6	230.6	229.5	228.5	AZ
	23.5	24.2	24.9	25.6	26.3	26.9	27.6	28.3	28.9	29.6	30.2	30.8	
41	238.5	237.6	236.7	235.8	234.9	233.9	233.0	232.0	231.0	230.0	229.0	227.9	
	23.0	23.6	24.3	25.0	25.7	26.3	27.0	27.6	28.2	28.9	29.5	30.1	
42	238.0	237.1	236.2	235.3	234.3	233.4	232.4	231.4	230.4	229.4	228.4	227.4	
	22.4	23.1	23.7	24.4	25.0	25.7	26.3	26.9	27.6	28.2	28.8	29.4	
43	237.5	236.6	235.7	234.8	233.8	232.9	231.9	230.9	229.9	228.9	227.9	226.8	
	21.8	22.5	23.1	23.8	24.4	25.0	25.7	26.3	26.9	27.5	28.1	28.6	
44	237.1	236.1	235.2	234.3	233.3	232.3	231.4	230.4	229.4	228.4	227.3	226.3	
	21.3	21.9	22.5	23.2	23.8	24.4	25.0	25.6	26.2	26.8	27.3	27.9	
45	236.6	235.7	234.7	233.8	232.8	231.9	230.9	229.9	228.9	227.9	226.8	225.8	AZ
	20.7	21.3	21.9	22.5	23.1	23.7	24.3	24.9	25.5	26.0	26.6	27.2	EL
46	236.1	235.2	234.3	233.3	232.4	231.4	230.4	229.4	228.4	227.4	226.3	225.3	
	20.1	20.7	21.3	21.9	22.5	23.1	23.6	24.2	24.8	25.3	25.9	26.4	
47	235.7	234.8	233.8	232.9	231.9	230.9	229.9	228.9	227.9	226.9	225.9	224.8	
	19.5	20.1	20.7	21.3	21.8	22.4	23.0	23.5	24.1	24.6	25.1	25.6	
48	235.3	234.3	233.4	232.4	231.4	230.5	229.5	228.5	227.5	226.4	225.4	224.4	
	18.9	19.5	20.1	20.6	21.2	21.7	22.3	22.8	23.3	23.9	24.4	24.9	
49	234.9	233.9	233.0	232.0	231.0	230.0	229.0	228.0	227.0	226.0	225.0	223.9	
	18.3	18.9	19.4	20.0	20.5	21.1	21.6	22.1	22.6	23.1	23.6	24.1	
50	234.5	233.5	232.5	231.6	230.6	229.6	228.6	227.6	226.6	225.6	224.5	223.5	AZ
	17.7	18.3	18.8	19.3	19.9	20.4	20.9	21.4	21.9	22.4	22.9	23.3	EL
51	234.1	233.1	232.1	231.2	230.2	229.2	228.2	227.2	226.2	225.2	224.1	223.1	
	17.1	17.6	18.2	18.7	19.2	19.7	20.2	20.7	21.2	21.6	22.1	22.6	
52	233.7	232.7	231.8	230.8	229.8	228.8	227.8	226.8	225.8	224.8	223.7	222.7	
	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.4	20.9	21.3	21.8	
53	233.3	232.4	231.4	230.4	229.4	228.4	227.4	226.4	225.4	224.4	223.3	222.3	
	15.9	16.4	16.9	17.3	17.8	18.3	18.8	19.2	19.7	20.1	20.6	21.0	
54	233.0	232.0	231.0	230.0	229.1	228.1	227.1	226.0	225.0	224.0	223.0	221.9	
	15.2	15.7	16.2	16.7	17.1	17.6	18.1	18.5	18.9	19.4	19.8	20.2	
55	232.6	231.7	230.7	229.7	228.7	227.7	226.7	225.7	224.7	223.6	222.6	221.6	AZ
	14.6	15.1	15.5	16.0	16.5	16.9	17.3	17.8	18.2	18.6	19.0	19.4	EL
56	232.3	231.3	230.3	229.4	228.4	227.4	226.4	225.3	224.3	223.3	222.3	221.2	
	14.0	14.4	14.9	15.3	15.8	16.2	16.6	17.0	17.5	17.9	18.3	18.7	
57	232.0	231.0	230.0	229.0	228.0	227.0	226.0	225.0	224.0	223.0	221.9	220.9	
	13.3	13.8	14.2	14.6	15.1	15.5	15.9	16.3	16.7	17.1	17.5	17.9	
58	231.7	230.7	229.7	228.7	227.7	226.7	225.7	224.7	223.7	222.7	221.6	220.6	
	12.7	13.1	13.5	14.0	14.4	14.8	15.2	15.6	16.0	16.3	16.7	17.1	
59	231.4	230.4	229.4	228.4	227.4	226.4	225.4	224.4	223.4	222.3	221.3	220.3	
	12.1	12.5	12.9	13.3	13.7	14.1	14.4	14.8	15.2	15.6	15.9	16.3	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Latitude	Site Longitude 96	97	98	99	100	101	102	103	104	105	106	107	
10	256.1	255.6	255.0	254.5	253.9	253.3	252.6	251.9	251.2	250.4	249.6	248.7	AZ
	48.0	49.0	50.1	51.2	52.3	53.3	54.4	55.5	56.6	57.6	58.7	59.7	EL
11	254.8	254.2	253.6	253.0	252.4	251.7	251.0	250.3	249.5	248.6	247.7	246.8	
	47.7	48.7	49.8	50.9	51.9	53.0	54.1	55.1	56.2	57.2	58.3	59.3	
12	253.5	252.9	252.2	251.6	250.9	250.2	249.4	248.6	247.8	246.9	246.0	245.0	
	47.4	48.4	49.5	50.5	51.6	52.6	53.7	54.7	55.8	56.8	57.8	58.8	
13	252.2	251.6	250.9	250.2	249.5	248.7	247.9	247.1	246.2	245.2	244.2	243.2	
	47.0	48.1	49.1	50.2	51.2	52.2	53.3	54.3	55.3	56.3	57.3	58.3	
14	250.9	250.3	249.6	248.8	248.1	247.3	246.4	245.5	244.6	243.6	242.6	241.5	
	46.7	47.7	48.7	49.8	50.8	51.8	52.8	53.8	54.8	55.8	56.8	57.8	
15	249.7	249.0	248.3	247.5	246.7	245.9	245.0	244.0	243.1	242.0	241.0	239.8	AZ
	46.3	47.3	48.3	49.3	50.3	51.3	52.3	53.3	54.3	55.3	56.3	57.2	EL
16	248.5	247.8	247.0	246.2	245.4	244.5	243.6	242.6	241.6	240.5	239.4	238.2	
	45.9	46.9	47.9	48.9	49.9	50.9	51.9	52.8	53.8	54.8	55.7	56.6	
17	247.3	246.6	245.8	244.9	244.1	243.1	242.2	241.2	240.2	239.1	237.9	236.7	
	45.5	46.5	47.4	48.4	49.4	50.4	51.3	52.3	53.2	54.2	55.1	56.0	
18	246.2	245.4	244.6	243.7	242.8	241.8	240.9	239.8	238.8	237.6	236.5	235.2	
	45.0	46.0	47.0	47.9	48.9	49.8	50.8	51.7	52.7	53.6	54.5	55.4	
19	245.1	244.2	243.4	242.5	241.5	240.6	239.6	238.5	237.4	236.3	235.1	233.8	
	44.6	45.5	46.5	47.4	48.4	49.3	50.2	51.2	52.1	53.0	53.9	54.7	
20	244.0	243.1	242.2	241.3	240.4	239.4	238.3	237.2	236.1	235.0	233.7	232.5	AZ
	44.1	45.0	46.0	46.9	47.8	48.7	49.6	50.5	51.4	52.3	53.2	54.0	EL
21	242.9	242.0	241.1	240.2	239.2	238.2	237.1	236.0	234.9	233.7	232.5	231.2	
	43.6	44.5	45.4	46.3	47.3	48.2	49.0	49.9	50.8	51.7	52.5	53.3	
22	241.9	241.0	240.0	239.1	238.1	237.0	235.9	234.8	233.7	232.5	231.2	229.9	
	43.1	44.0	44.9	45.8	46.7	47.6	48.4	49.3	50.1	51.0	51.8	52.6	
23	240.8	239.9	239.0	238.0	237.0	235.9	234.8	233.7	232.5	231.3	230.0	228.7	
	42.5	43.4	44.3	45.2	46.1	46.9	47.8	48.6	49.5	50.3	51.1	51.9	
24	239.8	238.9	237.9	236.9	235.9	234.8	233.7	232.6	231.4	230.2	228.9	227.6	
	42.0	42.9	43.7	44.6	45.4	46.3	47.1	47.9	48.8	49.6	50.3	51.1	
25	238.9	237.9	236.9	235.9	234.9	233.8	232.7	231.5	230.3	229.1	227.8	226.5	AZ
	41.4	42.3	43.1	44.0	44.8	45.6	46.5	47.3	48.0	48.8	49.6	50.3	EL
26	238.0	237.0	236.0	234.9	233.9	232.8	231.7	230.5	229.3	228.1	226.8	225.4	
	40.8	41.7	42.5	43.3	44.2	45.0	45.8	46.5	47.3	48.1	48.8	49.6	
27	237.0	236.1	235.0	234.0	232.9	231.8	230.7	229.5	228.3	227.1	225.8	224.4	
	40.2	41.1	41.9	42.7	43.5	44.3	45.1	45.8	46.6	47.3	48.0	48.8	
28	236.2	235.2	234.1	233.1	232.0	230.9	229.7	228.6	227.3	226.1	224.8	223.5	
	39.6	40.4	41.2	42.0	42.8	43.6	44.3	45.1	45.8	46.5	47.3	47.9	
29	235.3	234.3	233.3	232.2	231.1	230.0	228.8	227.6	226.4	225.2	223.9	222.6	
	39.0	39.8	40.6	41.4	42.1	42.9	43.6	44.3	45.1	45.8	46.5	47.1	
30	234.5	233.5	232.4	231.3	230.2	229.1	227.9	226.8	225.5	224.3	223.0	221.7	AZ
	38.4	39.1	39.9	40.7	41.4	42.1	42.9	43.6	44.3	45.0	45.6	46.3	EL
31	233.7	232.6	231.6	230.5	229.4	228.3	227.1	225.9	224.7	223.4	222.2	220.8	
	37.7	38.5	39.2	40.0	40.7	41.4	42.1	42.8	43.5	44.2	44.8	45.4	
32	232.9	231.8	230.8	229.7	228.6	227.5	226.3	225.1	223.9	222.6	221.3	220.0	
	37.1	37.8	38.5	39.3	40.0	40.7	41.4	42.0	42.7	43.3	44.0	44.6	
33	232.1	231.1	230.0	228.9	227.8	226.7	225.5	224.3	223.1	221.8	220.6	219.3	
	36.4	37.1	37.8	38.5	39.2	39.9	40.6	41.2	41.9	42.5	43.1	43.7	
34	231.4	230.3	229.3	228.2	227.1	225.9	224.7	223.6	222.3	221.1	219.8	218.5	
	35.7	36.4	37.1	37.8	38.5	39.1	39.8	40.4	41.1	41.7	42.3	42.9	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Longitude

Site Latitude	96	97	98	99	100	101	102	103	104	105	106	107	
35	230.7	229.6	228.5	227.5	226.3	225.2	224.0	222.8	221.6	220.4	219.1	217.8	AZ
	35.0	35.7	36.4	37.1	37.7	38.4	39.0	39.6	40.2	40.8	41.4	42.0	EL
36	230.0	228.9	227.9	226.8	225.6	224.5	223.3	222.1	220.9	219.7	218.4	217.1	
	34.3	35.0	35.7	36.3	37.0	37.6	38.2	38.8	39.4	40.0	40.6	41.1	
37	229.3	228.3	227.2	226.1	225.0	223.8	222.6	221.5	220.3	219.0	217.8	216.5	
	33.6	34.3	34.9	35.6	36.2	36.8	37.4	38.0	38.6	39.1	39.7	40.2	
38	228.7	227.6	226.5	225.4	224.3	223.2	222.0	220.8	219.6	218.4	217.1	215.9	
	32.9	33.5	34.2	34.8	35.4	36.0	36.6	37.2	37.7	38.3	38.8	39.3	
39	228.1	227.0	225.9	224.8	223.7	222.5	221.4	220.2	219.0	217.8	216.5	215.3	
	32.2	32.8	33.4	34.0	34.6	35.2	35.8	36.3	36.9	37.4	37.9	38.4	
40	227.4	226.4	225.3	224.2	223.1	221.9	220.8	219.6	218.4	217.2	216.0	214.7	AZ
	31.4	32.1	32.7	33.2	33.8	34.4	34.9	35.5	36.0	36.5	37.0	37.5	
41	226.9	225.8	224.7	223.6	222.5	221.3	220.2	219.0	217.8	216.6	215.4	214.2	
	30.7	31.3	31.9	32.5	33.0	33.6	34.1	34.6	35.1	35.6	36.1	36.6	
42	226.3	225.2	224.1	223.0	221.9	220.8	219.6	218.5	217.3	216.1	214.9	213.6	
	30.0	30.5	31.1	31.7	32.2	32.7	33.3	33.8	34.3	34.8	35.2	35.7	
43	225.8	224.7	223.6	222.5	221.4	220.2	219.1	217.9	216.8	215.6	214.4	213.1	
	29.2	29.8	30.3	30.9	31.4	31.9	32.4	32.9	33.4	33.9	34.3	34.8	
44	225.2	224.2	223.1	222.0	220.9	219.7	218.6	217.4	216.3	215.1	213.9	212.7	
	28.5	29.0	29.5	30.1	30.6	31.1	31.6	32.1	32.5	33.0	33.4	33.9	
45	224.7	223.6	222.6	221.5	220.4	219.2	218.1	216.9	215.8	214.6	213.4	212.2	AZ
	27.7	28.2	28.7	29.3	29.8	30.2	30.7	31.2	31.6	32.1	32.5	32.9	EL
46	224.2	223.2	222.1	221.0	219.9	218.8	217.6	216.5	215.3	214.1	213.0	211.8	
	26.9	27.4	27.9	28.4	28.9	29.4	29.9	30.3	30.8	31.2	31.6	32.0	
47	223.8	222.7	221.6	220.5	219.4	218.3	217.2	216.0	214.9	213.7	212.5	211.3	
	26.2	26.7	27.1	27.6	28.1	28.6	29.0	29.5	29.9	30.3	30.7	31.1	
48	223.3	222.2	221.1	220.1	219.0	217.8	216.7	215.6	214.4	213.3	212.1	210.9	
	25.4	25.9	26.3	26.8	27.3	27.7	28.2	28.6	29.0	29.4	29.8	30.2	
49	222.9	221.8	220.7	219.6	218.5	217.4	216.3	215.2	214.0	212.9	211.7	210.5	
	24.6	25.1	25.5	26.0	26.4	26.9	27.3	27.7	28.1	28.5	28.9	29.2	
50	222.4	221.4	220.3	219.2	218.1	217.0	215.9	214.8	213.6	212.5	211.3	210.2	AZ
	23.8	24.3	24.7	25.2	25.6	26.0	26.4	26.8	27.2	27.6	27.9	28.3	EL
51	222.0	221.0	219.9	218.8	217.7	216.6	215.5	214.4	213.3	212.1	211.0	209.8	
	23.0	23.5	23.9	24.3	24.7	25.2	25.5	25.9	26.3	26.7	27.0	27.4	
52	221.6	220.6	219.5	218.4	217.3	216.2	215.1	214.0	212.9	211.8	210.6	209.5	
	22.2	22.7	23.1	23.5	23.9	24.3	24.7	25.0	25.4	25.8	26.1	26.4	
53	221.2	220.2	219.1	218.0	217.0	215.9	214.8	213.7	212.5	211.4	210.3	209.1	
	21.4	21.9	22.3	22.7	23.0	23.4	23.8	24.2	24.5	24.9	25.2	25.5	
54	220.9	219.8	218.8	217.7	216.6	215.5	214.4	213.3	212.2	211.1	210.0	208.8	
	20.6	21.0	21.4	21.8	22.2	22.6	22.9	23.3	23.6	23.9	24.3	24.6	
55	220.5	219.5	218.4	217.3	216.3	215.2	214.1	213.0	211.9	210.8	209.7	208.5	AZ
	19.8	20.2	20.6	21.0	21.3	21.7	22.0	22.4	22.7	23.0	23.3	23.6	EL
56	220.2	219.1	218.1	217.0	215.9	214.9	213.8	212.7	211.6	210.5	209.4	208.2	
	19.0	19.4	19.8	20.1	20.5	20.8	21.2	21.5	21.8	22.1	22.4	22.7	
57	219.9	218.8	217.8	216.7	215.6	214.5	213.5	212.4	211.3	210.2	209.1	208.0	
	18.2	18.6	18.9	19.3	19.6	20.0	20.3	20.6	20.9	21.2	21.5	21.8	
58	219.5	218.5	217.4	216.4	215.3	214.2	213.2	212.1	211.0	209.9	208.8	207.7	
	17.4	17.8	18.1	18.4	18.8	19.1	19.4	19.7	20.0	20.3	20.6	20.8	
59	219.2	218.2	217.1	216.1	215.0	214.0	212.9	211.8	210.7	209.6	208.5	207.4	
	16.6	17.0	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.6	19.9	

Compliments of Satellite TV Magazine

Satcom IIIR Aiming Coordinates

Site Latitude	Site Longitude 108	109	110	111	112	113	114	115	116	117	118	119	
10	247.8	246.7	245.7	244.5	243.2	241.9	240.4	238.8	237.1	235.1	233.1	230.8	AZ
	60.8	61.8	62.9	63.9	64.9	66.0	67.0	67.9	68.9	69.9	70.8	71.7	EL
11	245.8	244.7	243.6	242.3	241.0	239.6	238.0	236.4	234.5	232.6	230.4	228.1	
	60.3	61.4	62.4	63.4	64.4	65.4	66.4	67.3	68.3	69.2	70.1	70.9	
12	243.9	242.8	241.6	240.3	238.9	237.4	235.8	234.1	232.2	230.2	228.0	225.6	
	59.8	60.9	61.9	62.8	63.8	64.8	65.7	66.7	67.6	68.5	69.3	70.1	
13	242.1	240.9	239.6	238.3	236.8	235.3	233.7	231.9	230.0	227.9	225.7	223.4	
	59.3	60.3	61.3	62.3	63.2	64.1	65.1	66.0	66.8	67.7	68.5	69.3	
14	240.3	239.1	237.8	236.4	234.9	233.3	231.6	229.8	227.9	225.9	223.7	221.3	
	58.8	59.7	60.7	61.6	62.6	63.5	64.4	65.2	66.1	66.9	67.7	68.5	
15	238.6	237.4	236.0	234.6	233.1	231.5	229.8	227.9	226.0	223.9	221.7	219.4	AZ
	58.2	59.1	60.1	61.0	61.9	62.8	63.6	64.5	65.3	66.1	66.8	67.6	EL
16	237.0	235.7	234.3	232.9	231.3	229.7	228.0	226.1	224.2	222.1	219.9	217.6	
	57.6	58.5	59.4	60.3	61.2	62.0	62.9	63.7	64.5	65.2	66.0	66.7	
17	235.4	234.1	232.7	231.2	229.7	228.0	226.3	224.4	222.5	220.5	218.3	216.0	
	56.9	57.8	58.7	59.6	60.4	61.3	62.1	62.9	63.6	64.4	65.1	65.7	
18	233.9	232.6	231.2	229.7	228.1	226.4	224.7	222.9	220.9	218.9	216.8	214.5	
	56.3	57.2	58.0	58.9	59.7	60.5	61.3	62.0	62.8	63.5	64.1	64.8	
19	232.5	231.1	229.7	228.2	226.6	224.9	223.2	221.4	219.5	217.4	215.3	213.1	
	55.6	56.4	57.3	58.1	58.9	59.7	60.4	61.2	61.9	62.6	63.2	63.8	
20	231.1	229.8	228.3	226.8	225.2	223.5	221.8	220.0	218.1	216.1	214.0	211.9	AZ
	54.9	55.7	56.5	57.3	58.1	58.9	59.6	60.3	61.0	61.6	62.3	62.8	EL
21	229.8	228.4	227.0	225.4	223.9	222.2	220.5	218.7	216.8	214.8	212.8	210.7	
	54.2	55.0	55.8	56.5	57.3	58.0	58.7	59.4	60.1	60.7	61.3	61.9	
22	228.6	227.2	225.7	224.2	222.6	220.9	219.2	217.4	215.6	213.6	211.6	209.6	
	53.4	54.2	55.0	55.7	56.4	57.2	57.8	58.5	59.1	59.7	60.3	60.9	
23	227.4	226.0	224.5	223.0	221.4	219.7	218.0	216.3	214.4	212.5	210.6	208.5	
	52.7	53.4	54.2	54.9	55.6	56.3	56.9	57.6	58.2	58.8	59.3	59.8	
24	226.2	224.8	223.3	221.8	220.2	218.6	216.9	215.2	213.4	211.5	209.6	207.6	
	51.9	52.6	53.3	54.0	54.7	55.4	56.0	56.6	57.2	57.8	58.3	58.8	
25	225.1	223.7	222.2	220.7	219.2	217.6	215.9	214.2	212.4	210.5	208.6	206.7	AZ
	51.1	51.8	52.5	53.2	53.9	54.5	55.1	55.7	56.3	56.8	57.3	57.8	EL
26	224.1	222.7	221.2	219.7	218.1	216.5	214.9	213.2	211.4	209.6	207.8	205.9	
	50.3	51.0	51.7	52.3	53.0	53.6	54.2	54.8	55.3	55.8	56.3	56.8	
27	223.1	221.7	220.2	218.7	217.2	215.6	214.0	212.3	210.5	208.8	207.0	205.1	
	49.5	50.1	50.8	51.4	52.1	52.7	53.2	53.8	54.3	54.8	55.3	55.8	
28	222.1	220.7	219.3	217.8	216.3	214.7	213.1	211.4	209.7	208.0	206.2	204.4	
	48.6	49.3	49.9	50.5	51.2	51.7	52.3	52.8	53.3	53.8	54.3	54.7	
29	221.2	219.8	218.4	216.9	215.4	213.8	212.2	210.6	208.9	207.2	205.5	203.7	
	47.8	48.4	49.0	49.6	50.2	50.8	51.3	51.9	52.3	52.8	53.3	53.7	
30	220.3	218.9	217.5	216.1	214.6	213.0	211.4	209.8	208.2	206.5	204.8	203.0	AZ
	46.9	47.6	48.2	48.7	49.3	49.8	50.4	50.9	51.3	51.8	52.2	52.6	EL
31	219.5	218.1	216.7	215.2	213.8	212.2	210.7	209.1	207.5	205.8	204.1	202.4	
	46.1	46.7	47.3	47.8	48.4	48.9	49.4	49.9	50.3	50.8	51.2	51.6	
32	218.7	217.3	215.9	214.5	213.0	211.5	210.0	208.4	206.8	205.2	203.5	201.9	
	45.2	45.8	46.3	46.9	47.4	47.9	48.4	48.9	49.3	49.8	50.2	50.5	
33	217.9	216.6	215.2	213.8	212.3	210.8	209.3	207.8	206.2	204.6	203.0	201.3	
	44.3	44.9	45.4	46.0	46.5	47.0	47.4	47.9	48.3	48.7	49.1	49.5	
34	217.2	215.8	214.5	213.1	211.6	210.2	208.7	207.1	205.6	204.0	202.4	200.8	
	43.4	44.0	44.5	45.0	45.5	46.0	46.5	46.9	47.3	47.7	48.1	48.4	

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Satcom IIIR Aiming Coordinates

Site Latitude	Site Longitude 108	109	110	111	112	113	114	115	116	117	118	119	
35	216.5	215.2	213.8	212.4	211.0	209.5	208.1	206.6	205.0	203.5	201.9	200.3	AZ
	42.5	43.1	43.6	44.1	44.6	45.0	45.5	45.9	46.3	46.7	47.0	47.4	EL
36	215.8	214.5	213.1	211.8	210.4	208.9	207.5	206.0	204.5	203.0	201.4	199.9	
	41.6	42.2	42.7	43.1	43.6	44.1	44.5	44.9	45.3	45.6	46.0	46.3	
37	215.2	213.9	212.5	211.2	209.8	208.4	206.9	205.5	204.0	202.5	201.0	199.5	
	40.7	41.2	41.7	42.2	42.6	43.1	43.5	43.9	44.3	44.6	44.9	45.3	
38	214.6	213.3	211.9	210.6	209.2	207.8	206.4	205.0	203.5	202.0	200.6	199.0	
	39.8	40.3	40.8	41.2	41.7	42.1	42.5	42.9	43.2	43.6	43.9	44.2	
39	214.0	212.7	211.4	210.0	208.7	207.3	205.9	204.5	203.1	201.6	200.1	198.7	
	38.9	39.4	39.8	40.3	40.7	41.1	41.5	41.9	42.2	42.5	42.8	43.1	
40	213.4	212.2	210.8	209.5	208.2	206.8	205.4	204.0	202.6	201.2	199.8	198.3	AZ
	38.0	38.4	38.9	39.3	39.7	40.1	40.5	40.8	41.2	41.5	41.8	42.1	EL
41	212.9	211.6	210.3	209.0	207.7	206.3	205.0	203.6	202.2	200.8	199.4	198.0	
	37.1	37.5	37.9	38.4	38.7	39.1	39.5	39.8	40.2	40.5	40.8	41.0	
42	212.4	211.1	209.8	208.5	207.2	205.9	204.6	203.2	201.8	200.4	199.0	197.6	
	36.1	36.6	37.0	37.4	37.8	38.1	38.5	38.8	39.1	39.4	39.7	40.0	
43	211.9	210.6	209.4	208.1	206.8	205.5	204.1	202.8	201.4	200.1	198.7	197.3	
	35.2	35.6	36.0	36.4	36.8	37.1	37.5	37.8	38.1	38.4	38.7	38.9	
44	211.4	210.2	208.9	207.7	206.4	205.1	203.8	202.4	201.1	199.7	198.4	197.0	
	34.3	34.7	35.1	35.4	35.8	36.1	36.5	36.8	37.1	37.4	37.6	37.9	
45	211.0	209.7	208.5	207.2	206.0	204.7	203.4	202.1	200.8	199.4	198.1	196.7	AZ
	33.3	33.7	34.1	34.5	34.8	35.2	35.5	35.8	36.1	36.3	36.6	36.8	EL
46	210.5	209.3	208.1	206.8	205.6	204.3	203.0	201.7	200.4	199.1	197.8	196.5	
	32.4	32.8	33.1	33.5	33.8	34.2	34.5	34.7	35.0	35.3	35.5	35.7	
47	210.1	208.9	207.7	206.5	205.2	204.0	202.7	201.4	200.1	198.8	197.5	196.2	
	31.5	31.8	32.2	32.5	32.8	33.2	33.5	33.7	34.0	34.2	34.5	34.7	
48	209.7	208.5	207.3	206.1	204.9	203.6	202.4	201.1	199.8	198.5	197.3	196.0	
	30.5	30.9	31.2	31.5	31.9	32.2	32.4	32.7	33.0	33.2	33.4	33.6	
49	209.4	208.2	207.0	205.7	204.5	203.3	202.1	200.8	199.5	198.3	197.0	195.7	
	29.6	29.9	30.3	30.6	30.9	31.2	31.4	31.7	31.9	32.2	32.4	32.6	
50	209.0	207.8	206.6	205.4	204.2	203.0	201.8	200.5	199.3	198.0	196.8	195.5	AZ
	28.6	29.0	29.3	29.6	29.9	30.2	30.4	30.7	30.9	31.1	31.4	31.5	EL
51	208.6	207.5	206.3	205.1	203.9	202.7	201.5	200.3	199.0	197.8	196.5	195.3	
	27.7	28.0	28.3	28.6	28.9	29.2	29.4	29.7	29.9	30.1	30.3	30.5	
52	208.3	207.1	206.0	204.8	203.6	202.4	201.2	200.0	198.8	197.6	196.3	195.1	
	26.8	27.1	27.4	27.6	27.9	28.2	28.4	28.7	28.9	29.1	29.3	29.5	
53	208.0	206.8	205.7	204.5	203.3	202.1	200.9	199.8	198.5	197.3	196.1	194.9	
	25.8	26.1	26.4	26.7	26.9	27.2	27.4	27.6	27.9	28.1	28.2	28.4	
54	207.7	206.5	205.4	204.2	203.1	201.9	200.7	199.5	198.3	197.1	195.9	194.7	
	24.9	25.1	25.4	25.7	25.9	26.2	26.4	26.6	26.8	27.0	27.2	27.4	
55	207.4	206.3	205.1	204.0	202.8	201.6	200.5	199.3	198.1	196.9	195.7	194.5	AZ
	23.9	24.2	24.5	24.7	25.0	25.2	25.4	25.6	25.8	26.0	26.2	26.3	EL
56	207.1	206.0	204.8	203.7	202.6	201.4	200.2	199.1	197.9	196.7	195.6	194.4	
	23.0	23.2	23.5	23.7	24.0	24.2	24.4	24.6	24.8	25.0	25.1	25.3	
57	206.8	205.7	204.6	203.5	202.3	201.2	200.0	198.9	197.7	196.6	195.4	194.2	
	22.0	22.3	22.5	22.8	23.0	23.2	23.4	23.6	23.8	24.0	24.1	24.3	
58	206.6	205.5	204.4	203.2	202.1	201.0	199.8	198.7	197.5	196.4	195.2	194.1	
	21.1	21.3	21.6	21.8	22.0	22.2	22.4	22.6	22.8	22.9	23.1	23.2	
59	206.3	205.2	204.1	203.0	201.9	200.8	199.6	198.5	197.4	196.2	195.1	193.9	
	20.1	20.4	20.6	20.8	21.0	21.2	21.4	21.6	21.8	21.9	22.1	22.2	

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Site Longitude

Site Latitude	120	121	122	123	124	125	126	127	128	129	130	131	
10	228.2	225.4	222.4	219.0	215.3	211.2	206.7	201.9	196.8	191.4	185.7	180.0	AZ
	72.6	73.4	74.2	75.0	75.7	76.3	76.9	77.3	77.7	78.0	78.2	78.2	EL
11	225.5	222.7	219.7	216.4	212.8	208.8	204.6	200.1	195.4	190.4	185.2	180.0	
	71.8	72.6	73.3	74.0	74.7	75.3	75.8	76.2	76.6	76.8	77.0	77.1	
12	223.1	220.3	217.3	214.1	210.6	206.8	202.8	198.6	194.1	189.5	184.8	180.0	
	70.9	71.7	72.4	73.1	73.7	74.2	74.7	75.1	75.5	75.7	75.8	75.9	
13	220.8	218.1	215.1	212.0	208.6	205.0	201.3	197.3	193.1	188.8	184.4	180.0	
	70.1	70.8	71.5	72.1	72.7	73.2	73.6	74.0	74.3	74.5	74.7	74.7	
14	218.8	216.1	213.2	210.2	206.9	203.5	199.9	196.1	192.2	188.2	184.1	180.0	
	69.2	69.9	70.5	71.1	71.6	72.1	72.5	72.9	73.2	73.4	73.5	73.5	
15	216.9	214.3	211.5	208.5	205.4	202.1	198.7	195.1	191.4	187.7	183.9	180.0	AZ
	68.3	68.9	69.5	70.1	70.6	71.1	71.4	71.8	72.0	72.2	72.3	72.4	EL
16	215.2	212.6	209.9	207.0	204.0	200.9	197.6	194.2	190.8	187.2	183.6	180.0	
	67.3	67.9	68.5	69.1	69.5	70.0	70.3	70.6	70.9	71.1	71.2	71.2	
17	213.6	211.1	208.4	205.7	202.8	199.8	196.7	193.5	190.2	186.8	183.4	180.0	
	66.4	67.0	67.5	68.0	68.5	68.9	69.2	69.5	69.7	69.9	70.0	70.0	
18	212.2	209.7	207.1	204.5	201.7	198.8	195.8	192.8	189.6	186.4	183.2	180.0	
	65.4	66.0	66.5	67.0	67.4	67.8	68.1	68.4	68.6	68.7	68.8	68.9	
19	210.8	208.4	205.9	203.3	200.7	197.9	195.0	192.1	189.1	186.1	183.1	180.0	
	64.4	64.9	65.4	65.9	66.3	66.7	67.0	67.2	67.4	67.6	67.7	67.7	
20	209.6	207.3	204.8	202.3	199.7	197.1	194.3	191.6	188.7	185.8	182.9	180.0	AZ
	63.4	63.9	64.4	64.8	65.2	65.6	65.9	66.1	66.3	66.4	66.5	66.5	EL
21	208.5	206.2	203.8	201.4	198.9	196.3	193.7	191.0	188.3	185.6	182.8	180.0	
	62.4	62.9	63.3	63.8	64.1	64.5	64.7	65.0	65.1	65.3	65.4	65.4	
22	207.4	205.2	202.9	200.6	198.1	195.7	193.1	190.6	188.0	185.3	182.7	180.0	
	61.4	61.8	62.3	62.7	63.0	63.3	63.6	63.8	64.0	64.1	64.2	64.2	
23	206.4	204.3	202.1	199.8	197.4	195.1	192.6	190.1	187.6	185.1	182.6	180.0	
	60.3	60.8	61.2	61.6	61.9	62.2	62.5	62.7	62.9	63.0	63.0	63.1	
24	205.5	203.4	201.3	199.1	196.8	194.5	192.1	189.8	187.3	184.9	182.5	180.0	
	59.3	59.7	60.1	60.5	60.8	61.1	61.4	61.6	61.7	61.8	61.9	61.9	
25	204.7	202.6	200.5	198.4	196.2	194.0	191.7	189.4	187.1	184.7	182.4	180.0	AZ
	58.3	58.7	59.1	59.4	59.7	60.0	60.2	60.4	60.6	60.7	60.7	60.8	EL
26	203.9	201.9	199.9	197.8	195.6	193.5	191.3	189.1	186.8	184.6	182.3	180.0	
	57.2	57.6	58.0	58.3	58.6	58.9	59.1	59.3	59.4	59.5	59.6	59.6	
27	203.2	201.2	199.2	197.2	195.1	193.0	190.9	188.8	186.6	184.4	182.2	180.0	
	56.2	56.6	56.9	57.2	57.5	57.8	58.0	58.1	58.3	58.4	58.4	58.5	
28	202.5	200.6	198.6	196.7	194.7	192.6	190.6	188.5	186.4	184.3	182.1	180.0	
	55.1	55.5	55.8	56.1	56.4	56.6	56.8	57.0	57.1	57.2	57.3	57.3	
29	201.8	200.0	198.1	196.2	194.2	192.2	190.2	188.2	186.2	184.1	182.1	180.0	
	54.1	54.4	54.7	55.0	55.3	55.5	55.7	55.9	56.0	56.1	56.1	56.2	
30	201.2	199.4	197.6	195.7	193.8	191.9	189.9	188.0	186.0	184.0	182.0	180.0	AZ
	53.0	53.3	53.7	53.9	54.2	54.4	54.6	54.7	54.9	55.0	55.0	55.0	EL
31	200.7	198.9	197.1	195.3	193.4	191.5	189.6	187.7	185.8	183.9	181.9	180.0	
	51.9	52.3	52.6	52.8	53.1	53.3	53.5	53.6	53.7	53.8	53.9	53.9	
32	200.1	198.4	196.6	194.9	193.0	191.2	189.4	187.5	185.6	183.8	181.9	180.0	
	50.9	51.2	51.5	51.7	52.0	52.2	52.3	52.5	52.6	52.7	52.7	52.7	
33	199.6	197.9	196.2	194.5	192.7	190.9	189.1	187.3	185.5	183.7	181.8	180.0	
	49.8	50.1	50.4	50.6	50.9	51.1	51.2	51.4	51.5	51.5	51.6	51.6	
34	199.2	197.5	195.8	194.1	192.4	190.6	188.9	187.1	185.4	183.6	181.8	180.0	
	48.7	49.0	49.3	49.5	49.8	49.9	50.1	50.2	50.3	50.4	50.5	50.5	

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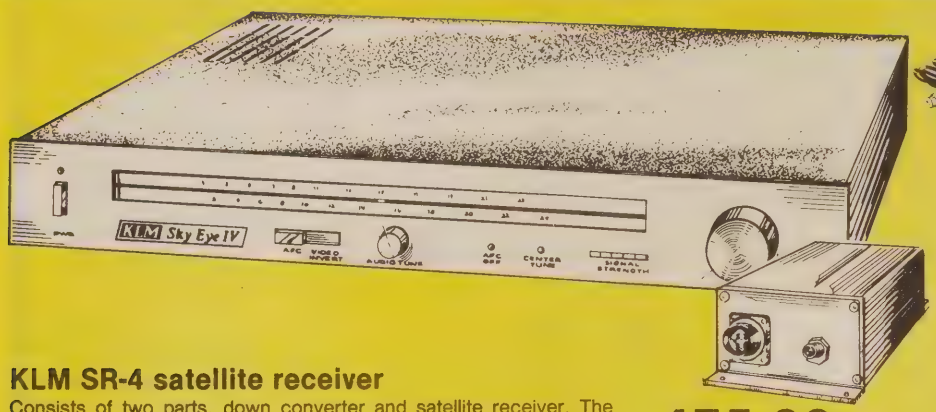
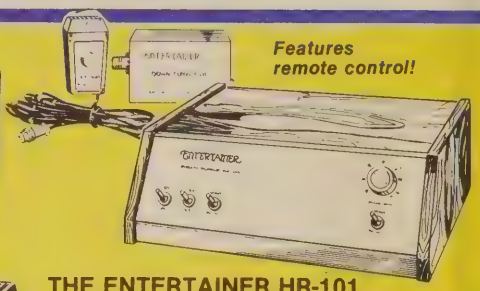


KLM SR-4 satellite receiver

Consists of two parts, down converter and satellite receiver. The down converter is mounted outdoors near the LNA and connected to the receiver by coaxial cable. Satellite receiver features slide rule tuning, AFC defeat, video invert and the latest in single-conversion electronics. Optional RF modulator adaptor available for 48.00

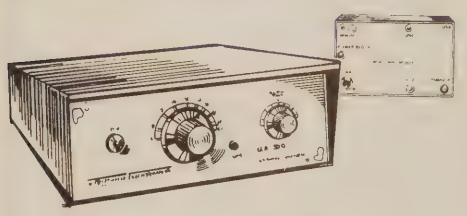
475.00
Dealer Price
List Price 995.00 Item No. KLMSR4
Call for UPS charges



THE ENTERTAINER HR-101
Satellite receiver with remote control

The HR-101 uses advanced technology to provide high quality satellite TV at an affordable price. Features fine tuning control and video invert switch. Audio subcarrier switch for 6.2 or 6.8 MHz. Comes with downconverter and remote control. Optional RF modulator available for 48.00.

599.95 Dealer Price
Item No. SSIHR101
Call for UPS charges



AUTOMATION TECHNIQUES
GLR-500 satellite receiver

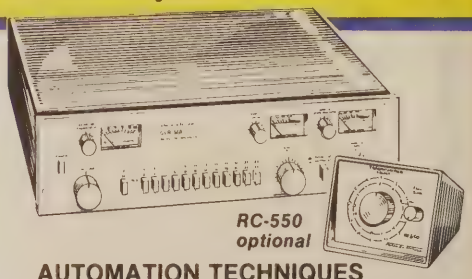
Features remote tuning module which may be mounted near the LNA allowing inexpensive low loss cable to be used for feed line. Special imageless mixer design effectively eliminates image frequency noise interference. Audio outputs at 6.2 and 6.8 MHz. Built in RF modulator.

647.05 Dealer Price
Item No. AUTGLR500
Call for UPS charges

AUTOMATION TECHNIQUES
GLR-520 satellite receiver

State of the art technology at an affordable price! Imageless design reduces interference. Features 12 button transponder selector and relative signal strength for easy tuning. Audio level control and audio level meter. Weatherized tuning module with LNA power block. Built in RF modulator.

764.70 Dealer Price
List Price 1195.00 Item No. AUTGLR520
Call for UPS charges



AUTOMATION TECHNIQUES
GLR-560 satellite receiver

New from Automation Techniques. Features A-B switch. Imageless design reduces interference. Two audio channels for stereo or matrix stereo sound. Convenient 12 button transponder selector and relative signal strength meter. Weatherized tuning module with LNA power block. Built in RF modulator.

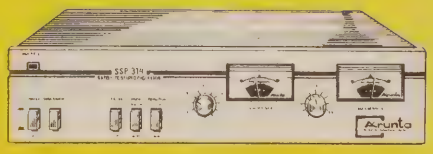
895.00 Dealer Price
Item No. AUTGLR560 Call for UPS charges.

RC-550 remote control. I.N. AUTRC550 . **70.00**

AUTOMATION TECHNIQUES
RC-500
remote control

For the GLR-500 receiver. Provides single-knob tuning control and broadlock AFC.

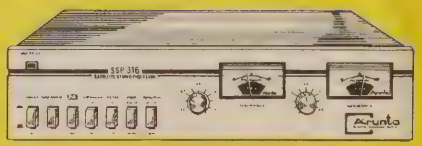
70.00 Dealer Price
Item No. AUTRC500 Call for UPS charges



ARUNTA SSP-314
Satellite stereo processor

Now you can add stereo sound to your satellite TV system. The SSP-314 accepts composite video signal from satellite receiver and converts it to a line level audio outputs for connection to any stereo amplifier or receiver. Features FM stereo multiplex indicator and twin tuning meters.

229.00 Dealer Price
Item No. ARU314 Call for UPS charges

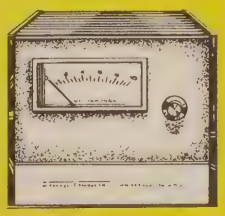


ARUNTA SSP-316
Satellite stereo processor

In addition to the features found on the SSP-314, the SSP-316 features Dynamic Noise Reduction and Dynamic Range Expansion. It will really make your audio come alive- especially music! Converts composite video signal from satellite receiver to line level stereo outputs. Twin tuning meters.

299.00 Dealer Price
Item No. ARU316 Call for UPS charges

AUTOMATION TECHNIQUES
RPM-500 relative power meter

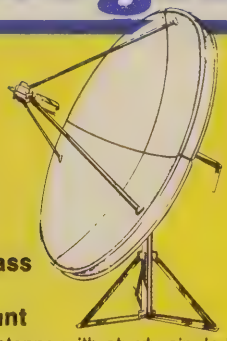


Plugs into receiver or tuning module to provide precise dish and horn optimization. Not for comparsion reading between receivers.

80.00 Dealer Price
Item No. AUTRPM500 Call for UPS charges

Easy-To-Assemble Fiberglass Dishes

CALL TOLL FREE
1-800-633-4984

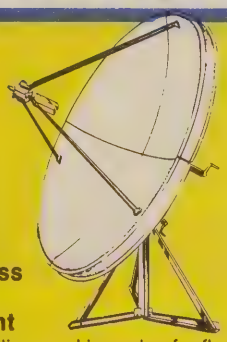


10 foot fiberglass dish antenna with polar mount

A complete dish antenna with sturdy single-leg polar mount. Dish made of reflective metal bonded with fiberglass and comes in four sections. Single pole polar mount provided with azimuth/elevation adjustments. Specify slab or earth mounting. LNA mount and rotor included. Complete less LNA support legs.

649.00 Dealer Price

Concrete Slab Mount Item No. MIS3/4PC
Earth Mount Item No. MIS3/4BP Shipped Motor Freight Collect



13 foot fiberglass dish antenna with polar mount

Dish comes in 4 sections and is made of reflective metal bonded with fiberglass. Azimuth and elevation adjustments for precise satellite tracking. Flanged connecting supports with holes for attachment to concrete base. LNA mount, rotor and control box included. Complete less LNA support legs.

1195.00 Dealer Price

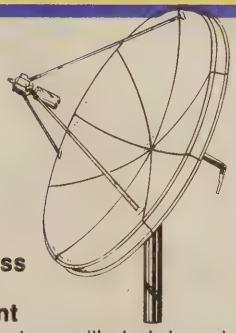
Item No. MIS4/4PC Shipped Motor Freight Collect

8 foot fiberglass dish antenna with polar mount

Constructed of reflective metal bonded with fiberglass. Dish comes in 8 sections. Azimuth and elevation adjustments for precise tracking. Flanged connecting supports with holes for attachment to concrete base. LNA mount, rotor and control box included. Complete less LNA support legs.

574.95 Dealer Price

Item No. MIS8 Shipped Motor Freight Collect

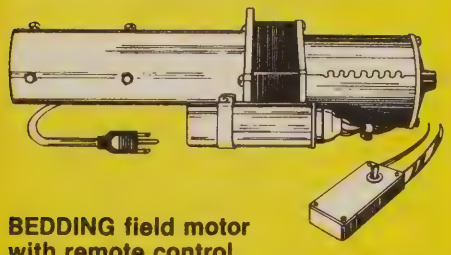


16 foot fiberglass dish antenna with polar mount

A 16 foot fiberglass antenna with single leg polar mount included. Antenna made of weather resistant fiberglass and comes in 8 sections. Azimuth and elevation adjustments for precise tracking. Also has secondary elevation adjustments. LNA mount and rotor included. Complete less LNA support legs.

2495.00 Dealer Price

Item No. MIS16 Shipped Motor Freight Collect



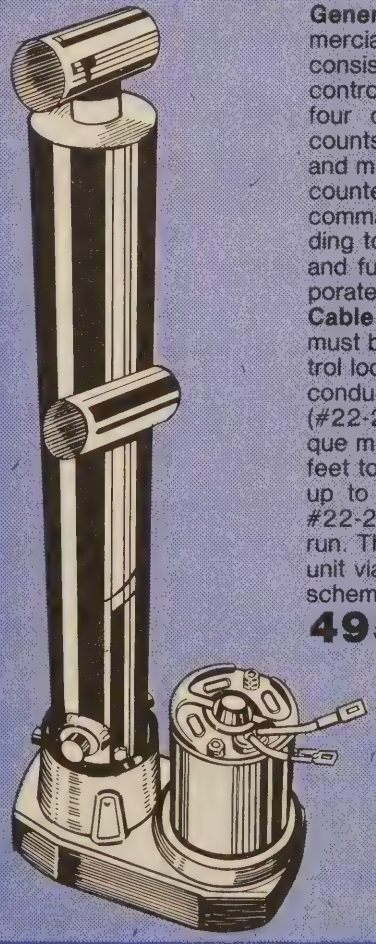
BEDDING field motor with remote control

Allows azimuth of antenna to be changed remotely. Designed to fit the azimuth control sleeve of out polar mounts. Comes with control box for selection of azimuth direction, AC cord and weatherized drop cord for connection to field motor. Grounded AC cable may be used between motor and control box.

175.00 Dealer Price

Item No. BEDR8500B Call for UPS charges

"TRACKER II" TVRO ANTENNA POSITIONER

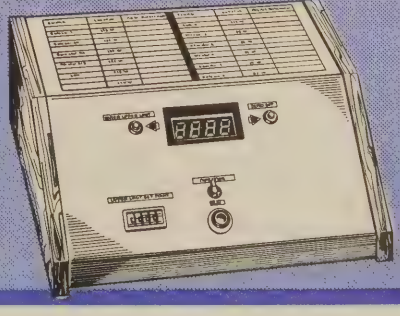


General The Tracker II Positioner offers a commercial quality unit at consumer level pricing. It consists of two basic components: a solid state control console and a 12VDC power actuator. A four digit counter within the control console counts position pulses fed to it from the actuator and motor assembly. The pulses not ony give the counter incremental position changes but also commands to count "Right" or "Left" corresponding to eastward travel. Electronic limits of travel and full circuit breaker protection are also incorporated.

Cable Installation. (A) Five conductors of wire must be run from the antenna location to the control location. Generally, this consists of two large conductors (#10) and three smaller conductors (#22-24). Due to the current draw of the high torque motor, #10 wire is required for runs from 50 feet to 750 feet. #12 wire may be used for runs up to 50 feet for the motor wiring. The three #22-24 wires are sufficient for any length of cable run. The five wires are connected to the actuator unit via a 5 pin plug and socket per the following scheme.

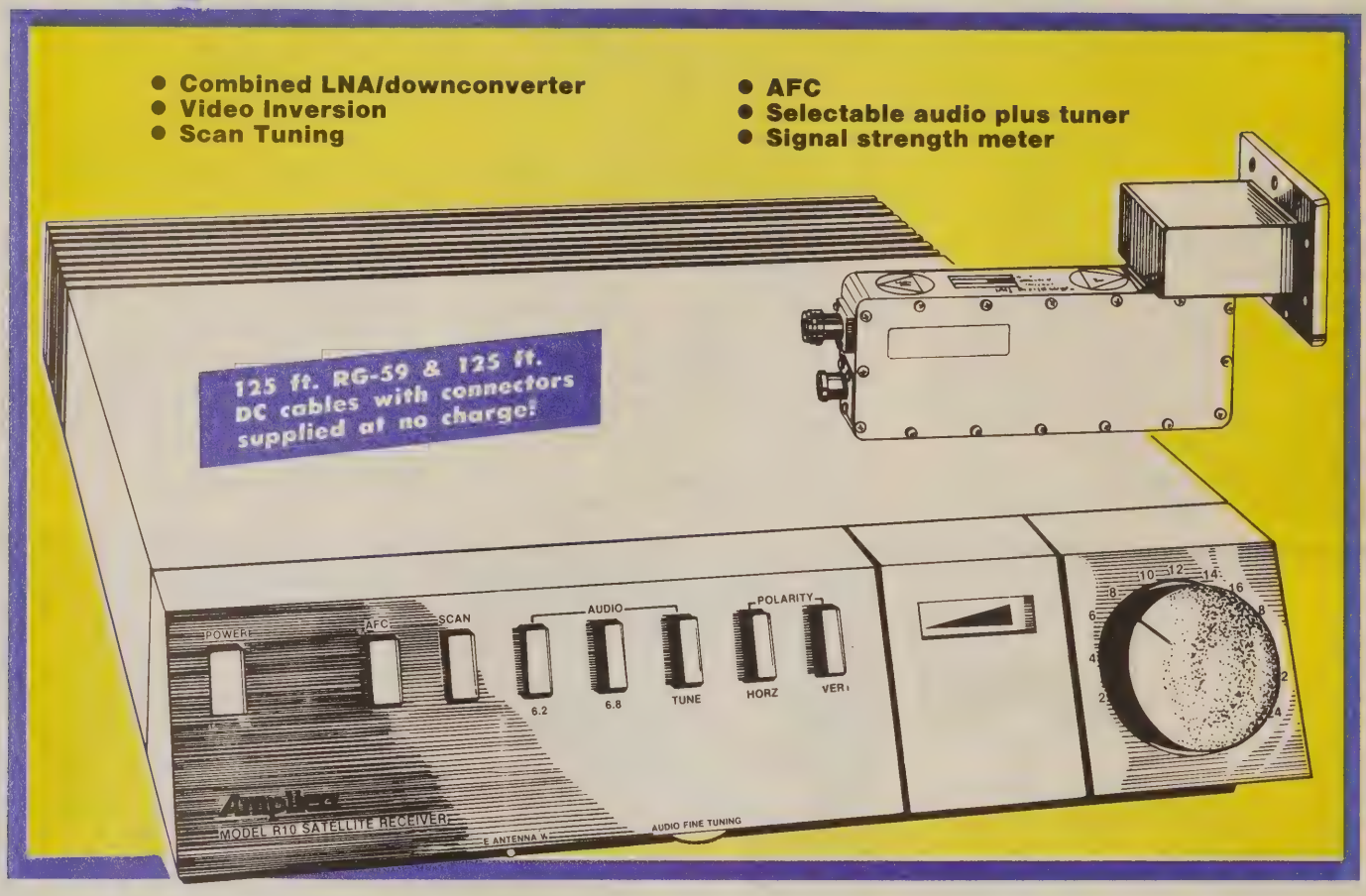
495.00 Dealer Price

Item No. LON1000.
Call for UPS charges



The "LNC" is here! Amplica RC-10 receiver

- Combined LNA/downconverter
- Video Inversion
- Scan Tuning
- AFC
- Selectable audio plus tuner
- Signal strength meter



Amplica RC-10 satellite TV Receiver System- in step with tomorrow!

The new RC-10 satellite TV receiver sytem from Amplica includes á 120 degree LNA with built in down converter, allowing for long cable runs with low cost low loss cable. Receiver features continuously variable satellite transponder selector, signal strength meter, scan tuning, video inversion and AFC defeat. Compact, low profile styling with slanted front control panel. Measures 11½" x 11" x 2 ⅝". RF modulator not included.

$945

DEALER PRICE

Item No. APLRC10 Call for UPS charges
Add 48.00 for RF modulator

R-10 Satellite Video Receiver- An Advancement in the Art

Unlike some receivers that are stripped versions of commerciál units, the R-10 is system engineered, designed from the ground up for private TVRO. This means you get many unmatched benefits such as:

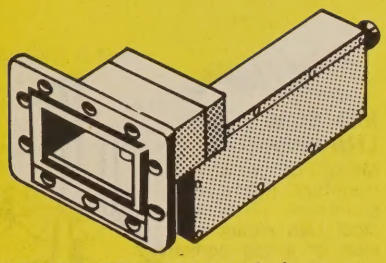
- **Decor-coordinated appearance and colors**
- **Fingertip control with pushbutton front panel**
- **Signal strength meter, for easy fine tuning**
- **Single power connection using household current.**
- **Rear power outlet for companion LNC.**
- **Best picture quality anywhere, from latest technology.**
- **Built-in accessory controls (polarization switch, antenna actuator).**

The Low Noise Converter- A signal "Superconditioner"

Amplica mates its famous LNA with a custom downconverter, to accomplish amplification, frequency, conversion and channel selection in one rugged, weather-proof package. Look at the extra benefits this gives you:

- **No separate downconverter to buy.**
- **Low-cost, low loss cable from LNC to receiver.**
- **Optimum factory tuning of LNC and receiver**
- **Built-in, advanced lightning-suppression circuitry.**
- **No external power supply to buy.**
- **Serialized, QC-approved, data supplied.**
- **Simple installation, without special hardware, or adaptors.**
- **High gain, allows up to 400' separation between antenna & receiver.**

Call Toll Free 1-800-633-4984 Today

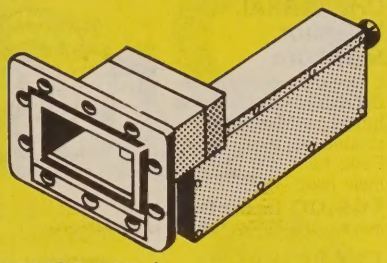


AMPLICA CD305305 120 degree low noise amplifier

A 120 degree uncooled LNA that provides frequency coverage from 3.7 to 4.2 GHz. Receives all satellite channels. Uses GaAs FET transistors for reliable performance. Rugged weatherproof, cast aluminum housing. Power supplied through coax feedline.

382.35 Dealer Price

Item No. APLLNA Call for UPS charges

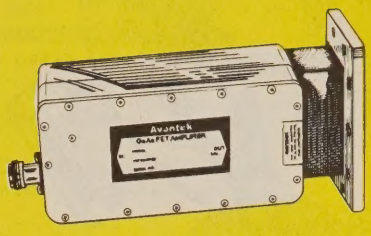


AMPLICA 100 degree low noise amplifier

Covers 3.7 to 4.2 GHz for total satellite channel coverage. This 100 degree uncooled LNA utilizes GaAs FET transistors for superior performance. Cast aluminum case is completely weatherproof. Power supplied through the coax line.

441.17 Dealer Price

Item No. APL100LNA Call for UPS charges



AVANTEK low noise amplifiers

The Avantek LNA's offer excellent performance and reliability and covers 3.7 to 4.2 GHz. Uses GaAs FET transistors for optimum performance. Cast aluminum weather-proof case. Power supplied through coax line.

382.35 120° Dealer Price Item No. AVN4215

441.17 100° Dealer Price Item No. AVN100LNA

Call for UPS charges

"Satellite TV"

90 of the best pages in TVRO and if you are just getting into satellite TV or have been a TVRO owner for sometime, you will find a wealth of useful information inside every issue. Absorbing articles cover every imaginable facet of home satellite TV.

3.50 each Dealer Price

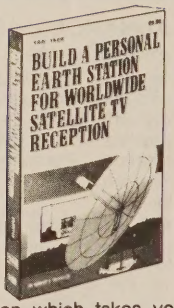
List 6.95 each Item No. BOOSATMAG

"Satellite Television Handbook and Buyers Guide"

Enables each user to get the most system for his money. Manufacturers addresses as well as listings for additional information included. Also covers programming info, technical data and installation. Complete with charts, maps and photographs. 86 pages.

7.00 each Dealer Price

List 9.95 Item No. BOOGLOSAT
6.25 each in lots of 10 or more Call for UPS charges

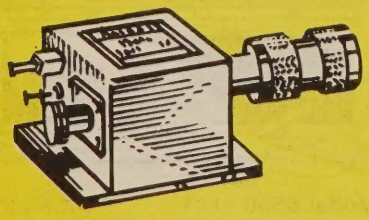


"Build a Personal Earth Station for Worldwide Satellite TV Reception"

A very thorough publication which takes you from the basics of television to instructions on how to build your own earth station from surplus gear or even from scratch! Listings of programming from the various satellites. Loaded with charts, diagrams and photographs. 296 pages.

7.00 each Dealer Price

List 9.95 Item No. BOOTAB1409
6.25 ea. In lots of 10 or more Call for UPS charges

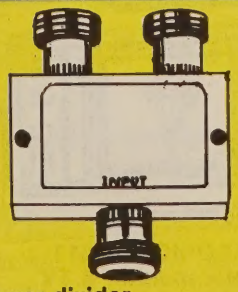


AVANTEK DCB-42 DC power block

Enables power to be fed via the coax line to the LNA even though satellite receiver lacks a DC power source. Rugged construction will provide years of reliable operation. Feed-through design with "N" type connectors. Requires 15-18V DC.

52.00 Dealer Price

Item No. AVNDCB42 Call for UPS charges

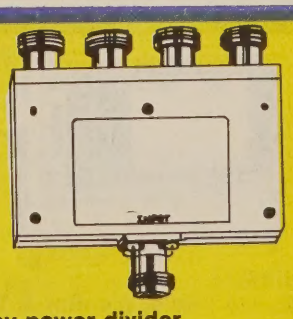


2 way power divider

Allows LNA output to be split. Engineered to provide low insertion loss and high isolation between output ports. Ruggedized construction. Bandwidth 3.7-4.2 GHz. Impedance 50 ohms. Isolation 25 dB. Insertion loss 0.3 dB. One input to two outputs. Type "N" connectors.

49.00 Dealer Price

Item No. MERPD20 Call for charges



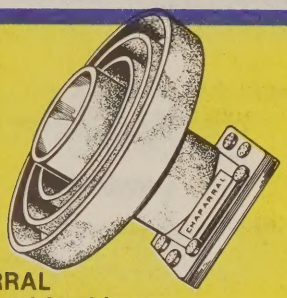
4 way power divider

Evenly splits LNA output four ways. Features low insertion loss, and high isolation between output ports. Ruggedized construction. Bandwidth 3.7-4.2 GHz. Impedance 50 ohms. Isolation 25 dB. Insertion loss 0.5 dB. One input to four outputs. Type "N" connectors.

89.00 Dealer Price

Item No. MERPD42 Call for UPS charges

Long's Has Everything for Satellite Systems



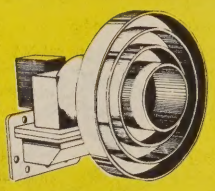
CHAPARRAL Super Feed feed horn

Designed for use with parabolic antennas with F/D ratios of 0.33 to 0.45. For antennas with a ratio of 0.38, the Super Feed will give at least 0.5 dB improvement over conventional rectangular horns. Measured VSWR better than 1.2 to 1. Contributes virtually nothing to system noise.

28.00 Dealer Price

List Price 135.00 Item No. AVOCHAP
Call for UPS charges.

CHAPARRAL Polarotor feed horn

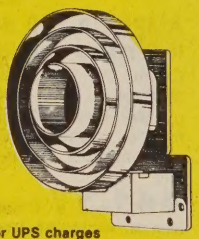


Changes polarity without a rotor! Probe inside horns waveguide is rotated by small servo. Feed horn and LNA remain fixed.

149.00 Dealer Price

Item No. CHAPOLAROTOR Call for UPS charges

CHAPARRAL Dual Feed II feed horn

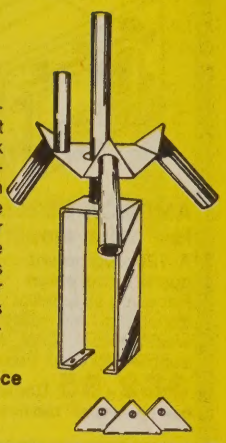


Designed for systems that utilize two LNA's. Allows both LNA's to be mounted to the rear. VSWR is better than 1.4 to 1. Isolation 30 dB.

109.00 Dealer Price

Item No. CHADUALFEED Call for UPS charges

Milk Stool LNA mount

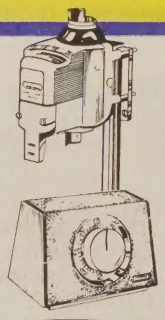


Made of weather-resistant lightweight aluminum. The milk stool LNA mount consists of a top portion made for mounting the LNA rotor and a holder made for mounting the LNA itself. Includes mounting flanges for legs. Tubing for legs and clamps not included.

44.00 Dealer Price

Item No. MINLNA
Call for UPS charges

ALLIANCE U-100 antenna rotor



Features clockwise or anti-clockwise rotation, instant reverse and positive stop at end of rotation. Permanently lubricated. Control box included.

44.00 Dealer Price

List Price 69.95 Item No. ALIU100
Call for UPS charges

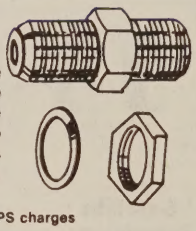
LNA rotor cover

Constructed of fiberglass and finished in white to match with your dish. Comes complete with mounting tabs fastened to cover.

25.00 Dealer Price

Item No. MINILNACOVER Call for UPS charges

Universal female F to F coupling

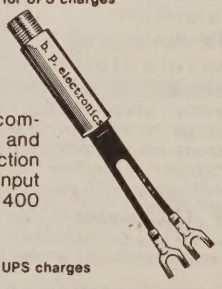


A must for anyone in the satellite TV or video business! Two female connectors allow you to easily extend cables with male F connectors.

45¢ Dealer Price

Item No. BPESP278 Call for UPS charges

VHF/UHF matching transformer

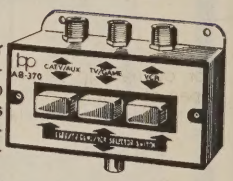


Miniature size completely sheilded and balanced for reduction of direct pick-up. Input 75 ohms. Output 400 ohms.

59¢ Dealer Price

Item No. BPEMT Call for UPS charges

3 position coaxial push button switch box

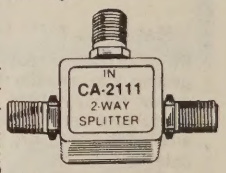


Heavily shielded for maximum isolation between inputs. 3 inputs to one output. Inputs selected by push buttons. Uses F connectors. Mounting flange.

5.95 Dealer Price

Item No. BPEAB370 Call for UPS charges

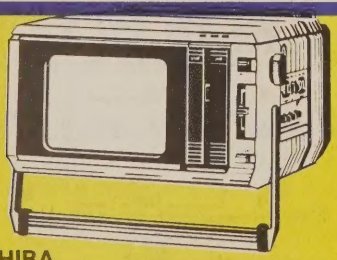
2-way VHF/UHF splitter



One input to two outputs. Uses F connectors all around. Bandwidth: 5-400 MHz. Maximum splitter loss: 3.5 dB. Impedance: 75 ohms.

1.98 Dealer Price

Item No. BPECA2111 Call for UPS charges

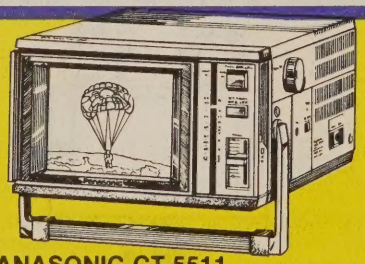


TOSHIBA CA045 4½'' color monitor & TV

This ultra compact monitor from Toshiba features RCA type jacks for audio in, video in, audio out and video out. Also has standard VHF/UHF tuner. Exclusive degauss button on rear of set. Operates on AC/DC and supplied with car battery cord. Built in carrying handle and sunshield.

339.00 Dealer Price

List Price 439.00 Item No. TOSCA045
Call for UPS charges

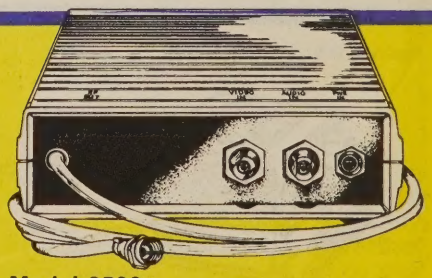


PANASONIC CT-5511 5'' color monitor & TV

Compact and portable. Features RCA type input/output jacks for video and audio. Also has standard VHF/UHF tuner with ColorPilot to keep colors stable. LED "on channel" indicator. Operates AC/DC or from optional rechargeable batteries. Built in carrying handle. Supplied with sunshield and car battery cord.

359.00 Dealer Price

List Price 449.95 Item No. PANCT5511
Call for UPS charges



Model 6500 commercial RF modulator

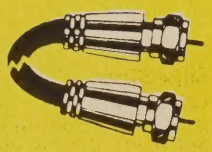
Add excellent color reproduction and true high fidelity sound to your satellite TV system. Allows satellite TV reception on any TV set. Accepts direct video and audio outputs from satellite TV receiver and converts to RF signal on either channel 3 or 4. Uses "F" type connectors. Power supply included.

48.00 Dealer Price

Item No. PCM6500 Call for UPS charges

Order The Easy Way By Mail or Phone

BPV-3056 6 foot F to F cable

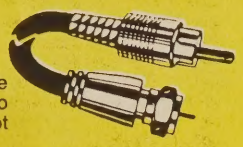


Quality 75-ohm cable with "F" type connectors on each end. 6 foot lengths.

2.20 Dealer Price

Item No. BPEF6F Call for UPS charges

BPV-3703 3 foot RCA to F cable

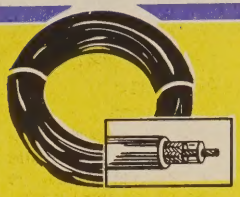


Fully shielded RF cable with male RCA plug to "F" connector. 3 foot lengths.

2.29 Dealer Price

Item No. BPEV3703 Call for UPS charges

RG-217 coaxial cable

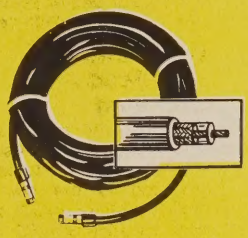


Use for connecting LNA to satellite receiver. Weatherproof, heavy duty. 14 dB loss per 100 feet.

99.00 per 100 ft. Dealer Price

Item No. WPNRG217 Call for UPS charges

RG-213 15 ft. down converter cable with connectors

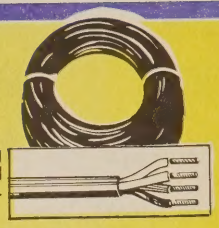


For use between LNA and down converter. Nominal impedance-50 ohms. Comes complete with "N" type connectors on each end. 15 foot lengths.

21.00 per 15 ft. Dealer Price

Item No. PCM213 Call for UPS charges

100 foot 4 conductor rotor cable



Ideal for connecting LNA rotor to control box. Standard wire conductors. 20 guage.

10.00 per 100 ft. Dealer Price

Item No. 181-100 Call for UPS charges

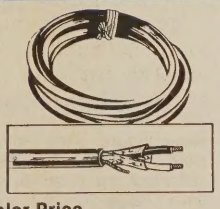
RG-59/U coaxial cable

Perfect for outdoor use. 95% shield. Center conductor 20 gauge copper. 75 ohms nominal impedance.

13.00 per 100 ft. Dealer Price

Item No. WPN843 Call for UPS charges

WEST PENN No. 975 2 conductor shielded cable

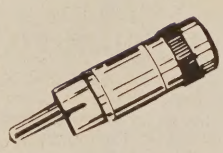


For connecting certain types of remote control units to satellite receivers.

14.00 per 100 ft. Dealer Price

Item No. WPN975 Call for UPS charges

Phono plug



Standard 1/8" RCA type male plug. For audio connections on satellite receivers, VCR's, etc.

14¢ ea. Dealer Price

Item No. AVCPHONO Call for UPS charges

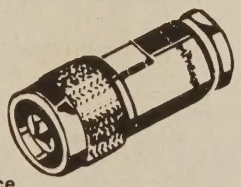
F connector crimping tool

Heavy duty steel construction. For RG-55, 58, 59, 110, 141, 210, 233, 303 and 400 cables.

7.95 ea. Dealer Price

Item No. AVCCRIMP Call for UPS charges

Type N connector



For 50 or 70 ohm cable. Accepts RG-8, 9, 213, 214 and 225 cable. Cable termination: ML clamp I. Designed for super high frequencies.

4.40 ea. Dealer Price

Item No. APH82-96 Call for UPS charges

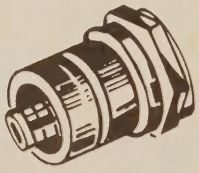
Type N double male adaptor

Will handle microwave frequencies. Constant impedance for use with 50 ohm cable. Weatherproof.

5.41 ea. Dealer Price

Item No. AVCNMALE Call for UPS charges

Male F connectors



Crimp on type. Provides 75 ohms constant impedance. For use on RG-59/U cables

22¢ ea. Dealer Price

Item No. AVCAF59A Call for UPS charges

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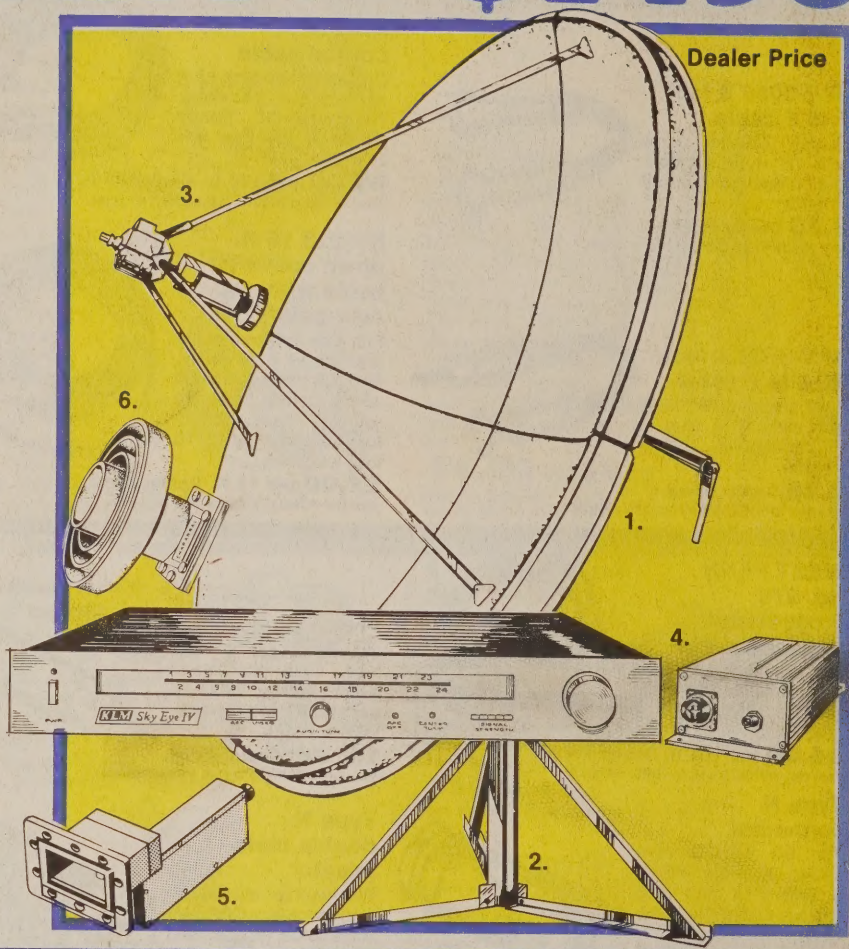
10 FT. PARABOLIC

What the system will do:
Receives up to 60 channels of TV direct from satellites to your home receiver. Movies, sports, cultural events, religious programs, other TV stations and much more.

What the system includes:
1. A 10 ft. fiberglass dish made of reflective metal bonded with fiberglass. Weather resistant and virtually maintenance free. Comes in four sections.
2. Polar mount complete with azimuth and elevation adjustments for precise satellite-to-satellite tracking. Patented linkage allows dish to travel from horizon to horizon.
3. LNA mount complete with rotor. Enables LNA to be positioned remotely for vertical or horizontal polarity. Control box included. Extension poles not included.
4. KLM SR-4 satellite receiver. Consists of two parts, downconverter and receiver. Downconverter mounts outside and is connected to receiver by coaxial cable. Satellite receiver features slide rule tuning, AFC defeat, video inversion and the latest single-conversion electronics. RF modulator optional.
5. Amplica 305305 low noise amplifier. Consists of a 120° uncooled LNA. Takes the weak signals reflected from the dish and amplifies them prior to being sent to the downconverter. Uses GaAs FET transistors for maximum performance. Powered through coax line. Urethane coated.
6. Chaparrel feed horn. Provides 0.5 dB gain improvement over conventional rectangular horns. Virtually eliminates system noise.
Note: Customer must provide all cables (approx. cost $80) VCR may be used as RF modulator. Otherwise RF modulator required (approx. cost $48).



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